

## Amendment No. 15 of Agreement No. S010222/S011253/S060120 for

# Communications System Agreement for the 911 RDMT Radio Project between Motorola Communications & Electronics ("Motorola") and the City of Austin ("Customer")

- 1.0 The term of the Agreement shall be extended until December 27, 2020.
- 2.0 The total Agreement amount is increased by a not to exceed amount of \$10,000,000.00. The total Agreement authorization is recapped below:

Term	Action Amount	Total Agreement Amount
Original Agreement:	\$73,962,244	\$73,962,244
Amendment No. 1: Changed Agreement language; no cost impact	N/A	\$73,962,244
Amendment No. 2: Changed Agreement language; no cost impact	N/A	\$73,962,244
Amendment No.3: Increased the Agreement to upgrade the radio system infrastructure	\$4,385,132	\$78,347,376
Amendment No. 4: Increased the Agreement to upgrade the radio system operating software	\$8,056,000	\$86,403,376
Amendmet No. 5: Incorporate documents regarding extension of system into Williamson County, revise project timeline; no cost impact	N/A	\$86,403,376
Amendment No. 6: Increase the Agreement for the purchase of add-on equipment and services and extend the discount structure and term of Agreement through 2015	\$1,789,098	\$88,192,474
Amendment No. 7: Increase the Agreement for the Bastrop/Lockhart expansion (\$6,392,528) and for the purchase of addon equipment and services (\$1,987,930)	\$8,380,458	\$96,572,932
Amendment No. 8: Modify Project Schedule and payment terms for COPS 2007; no cost impact	N/A	\$96,572,932
Amendment No. 9: Increase the Agreement for the purchase of additional equipment and services	\$1,271,000	\$97,843,932

Amendment No. 10: Increase the Agreement for the purchase of additional equipment and services	\$1,056,800	\$98,900,732
Amendment No. 11: Add subscriber radio equipment to Agreement	No additional funding required	\$98,900,732
Amendment No. 12: Infrastructure upgrade project, additional equipment and services	\$3,293,000	\$102,193,732
Amendment No. 13: Trade-in of radio	No additional funding required	\$102,193,732
Amendment No. 14: Infrastructure critical replacement, FY13 through FY18.	\$32,000,000	\$134,193,732
Extend discount pricing and term of Agreement to December 27, 2020	\$10,000,000	\$144,193,732

- 3.0 MBE/WBE goals were not established for this Agreement.
- 4.0 By signing this Amendment the Contractor certifies that the Contractor and its principals are not currently suspended or debarred from doing business with the Federal Government, as indicated by the General Services Administration (GSA) List of Parties Excluded from Federal Procurement and Non-Procurement Programs, the State of Texas, or the City of Austin.
- 5.0 All other terms and conditions of the Agreement remain the same.

BY THE SIGNATURES affixed below, this Amendment is referenced Agreement.	hereby incorporated into and made a part of the above
Signature:	Signature: Demay Lucas
Printed Name: Edward Fuerst  Authorized Representative: M5551 Vice President	Denise Lucas, Deputy Purchasing Officer City of Austin Purchasing Office
Date: 12 (11   12	Date: 17 13 2012

# AMENDMENT NO. 14

#### TO THE

# COMMUNICATIONS SYSTEM AGREEMENT FOR THE 911 RDMT RADIO PROJECT BETWEEN

## THE CITY OF AUSTIN, TEXAS AND MOTOROLA SOLUTIONS, INC.

This amendment to the December 27, 2000 Communications System Agreement ("Agreement") is made and entered into between Motorola Solutions Inc., a Delaware Corporation and formerly known as Motorola, Inc. ("Motorola"), and the City of Austin ("Customer"), a Texas home-rule municipal corporation Motorola and Customer may be referred to individually as a "Party" and collectively as the "Parties."

WHEREAS, the Parties entered into the Agreement on December 27, 2000 for the purchase and installation of an 800 MHz Trunked Radio Communications System ("Communication System"); and,

WHEREAS, Motorola submitted a proposal, dated October 15, 2012 (the "Proposal") to the Customer to upgrade the Communication System from its current software release to future software releases including the provisioning of new Equipment, Software, parts, and services; and,

WHEREAS, the Customer desires to upgrade the Communication System by implementing the Life Cycle Upgrade Proposal;

NOW, THEREFORE, in consideration of the mutual promises and the good and valuable consideration thereof, and pursuant to provision 20.14 of the Agreement, the Parties hereby enter into this Amendment No. 14 pursuant to which Motorola shall perform the work and furnish the equipment and services as more fully set forth herein. All terms and conditions of the Agreement shall remain in full force and effect except as modified herein solely for the purpose of the work being performed under this Amendment 14.

 Section 1 (Exhibits) of the Agreement is hereby amended by deleting Exhibits B through H and inserting the following Exhibits:

Exhibit B	Technical Exhibits
B-1a	Statement of Work for Subsystems dated October 15, 2012 (Section 3 of
the Proposal)	
B-1b	Statement of Work SUA II dated August 24, 2012 (Section 4 of the
Proposal)	
B-2	Acceptance Test Plan or "ATP" is to be developed and mutually agreed upon during the Detailed Design Review
B-3	Solution Overview dated October 15, 2012 (Section 2 of the Proposal)
B-4	Equipment List dated November 26, 2012
B-5	Performance Schedule is to be developed and mutually agreed upon during the Detailed Design Review.
Exhibit C	"Subsystem Acceptance Certificate"
Exhibit D	Payment Schedule

- 2. Under Section 2 (Definitions), the following revisions apply:
  - a. The definition of Acceptance Test Plan is hereby revised by replacing the word "System" with "Subsystem."
  - b. The definitions of "Final System Acceptance", "Phase 1", and "Project" are hereby deleted.
  - c. The definition of "Phase" is hereby revised to mean: "a defined stage in the System lifecycle management, as set forth in the Technical Documents".

- d. The definition of "Statement of Work" is hereby revised by replacing "Exhibit B-1" with "Exhibits B-1a and B-1b" and any reference to "Exhibit B-1" in the Agreement shall be revised to reference either Exhibit B-1a or Exhibit B-1b, as applicable.
- e. The following definition shall be added: "SUA" means Motorola's Software Upgrade Agreement program. This Agreement includes the SUA II program.
- f. The following definition shall be added: "Subsystem" means a major part of the System that performs specific functions or operations. Subsystems are described in the Technical Exhibits.
- g. The following definition shall be added: 'Subsystem Acceptance' means the Acceptance Tests have been successfully completed for a particular Subsystem as detailed in Exhibit B-1a.
- h. The definition of "System Description" is hereby deleted and replaced by the following term and definition: "Solution Overview" means the complete description of the lifecycle upgrade solution as set forth in Exhibit B-3.
- 3. Section 3.1 is hereby deleted with respect to this Amendment 14 only.
- Section 3.3 (Scope of Work) is hereby revised by replacing the entire provision with the following paragraph:

"This Amendment involves up to a six (6) Phase life cycle project during which Motorola will upgrade an existing system from its current software release to future software releases and will provide the Equipment, Software, parts, and services to complete this life cycle project, all as more completely described in the Technical Exhibits (including the Subsystem Statement of Work and the SUA II Statement of Work). Motorola will provide, install and test the Subsystems as upgraded, and perform its other contractual responsibilities, all in accordance with this Agreement. Customer will perform its contractual responsibilities in accordance with this Agreement."

- 5. Section 3.5 (Maintenance Service) is hereby deleted.
- 6. Section 4.1 (Term of Agreement) is hereby revised to read:

"The term of this Amendment shall be from the date the Amendment is signed by an authorized representative of the City through the expiration of the Warranty Period.

- 7. Under Section 5 (Contract Price), the following revisions apply:
  - a. Section 5.1.1 (Initial Contract Amount) is hereby revised to read:
    - A. The not to exceed Contract Price in U.S. dollars is \$32,000,000.00. Upon execution of this Amendment, Customer will issue an encumbrance document to Motorola for \$5,333,333.33 as verification that the funds for Phase 1 are available for payment to Motorola upon completion of the deliverables. Thereafter, Customer will issue another encumbrance document annually each year for the remaining five (5) years of the Project in the same amount unless a different dollar amount has been mutually agreed upon in writing.
  - b. Sections 5.1.2 (Option to Purchase), 5.3 (Milestone Payment Schedule), 5.4 (Additional Products), 5.6 (Prices For Equipment and Technology Support), and 5.10 (Retainage) are hereby deleted.

- c. Section 5.2 (Contract Payment) is hereby revised to read: "Motorola will invoice City for each Phase according to the Payment Schedule. If the milestone has been accepted by Customer, Customer will pay each invoice within thirty (30) days of the invoice date to the Motorola office designated by Motorola."
- d. Section 5.9 is hereby revised to read: "The Customer shall not be obligated to pay for any changes to the Project unless a Change Order Form has been executed by the Customer and Motorola in accordance with Section 3.4. Payment for Change Orders will be as mutually agreed upon and documented in the Change Order Form."
- 8. Section 7 (Training) is hereby deleted.
- 9. Under Section 8 (Acceptance), the following revisions apply:
  - a. Section 8.1 (System Acceptance) is hereby revised to read: "SUBSYSTEM ACCEPTANCE.' Subsystem Acceptance will occur upon successful completion of the relevant Acceptance Tests for a particular Subsystem. Upon Subsystem Acceptance, the Parties will memorialize this event by promptly executing a Subsystem Acceptance Certificate. If Customer believes the Subsystem has failed the completed Acceptance Tests, Customer will provide to Motorola a written notice that includes the specific details of the failure. If Customer does not provide to Motorola a failure notice within thirty (30) days after completion of the Acceptance Tests, Subsystem Acceptance will be deemed to have occurred as of the completion of the Acceptance Tests. Minor omissions or variances in the Subsystem that do not materially impair the operation of the Subsystem as a whole will not postpone Subsystem acceptance, but will be corrected according to a mutually agreed schedule.
  - b. Section 8.2 (Acceptance Procedures) is hereby revised to read: "Motorola shall notify the Customer in writing when Motorola determines that a Subsystem is ready for acceptance testing in accordance with the Subsystem Statement of Work and Acceptance Test Plan. The parties will then perform the Acceptance Test Plan in accordance with the mutually agreed upon schedule. Upon achieving Subsystem Acceptance the parties will execute a certificate of acceptance."
- 10. Under Section 9 (Warranty), the following revisions apply:
  - a. Section 9.1.1 is hereby revised to read: "Warranty Period' The warranty period for Equipment and Motorola Software provided under the Subsystem Statement of Work means one (1) year from the date of each Subsystem Acceptance. "Warranty Period' for work performed as described in the SUA II Statement of Work and as part of the SUA II program means a period of ninety (90) days from the date the performance of the service are completed."
  - Sections 9.1.2 (Warranty Period For Consoles), 9.1.3 (Warranty Period For Subscribers and Portables), and 9.2 (System Warranty) are hereby deleted.

#### 11. Section 11.4 is hereby revised to read:

a. "Motorola agrees to pay to the Customer liquidated damages for Motorola's failure to achieve Subsystem Acceptance. The maximum amount of liquidated damages that Motorola is obligated to pay to Customer, inclusive of any and all annual extension periods will be: \$2,000 per day for the first 30 days; \$3,000 per day for the next 30 days; and \$5,000 per day for the next 180 days. If City wishes to assert a claim that it is owed liquidated damages, it must first give formal written notice to Motorola. Delays that are excused under Section 11.2 and delays caused by the Customer or its employees, representatives, agents, or other contractors are not covered. Motorola and City agree

that, although such damages are difficult to ascertain, liquidated damages as more fully described below are a reasonable approximation of the amount of damages that City would suffer as a result of Motorola's failure to achieve Subsystem Acceptance as scheduled, and that such liquidated damages are not a penalty. These liquidated damages are intended to compensate City as its sole and exclusive remedy for all damages caused by such delay. In determining the liquidated damages amount, Motorola and City have taken into consideration the types and anticipated amounts of possible damages that the City might incur as well as the other provisions of this Agreement that protect City concerning Motorola's performance, such as the milestone payments. This liquidated damages provision is for the benefit of only the City and not for any other Eligible User purchasing off of this Agreement."

12. Section 16 (Limitation of Liability) shall be revised, for this Amendment only, by replacing the phrase "the price of Phase 1 Infrastructure and Services, the price of Phase II Services, and the price of the City's User Equipment as stated in Subsection 5.1.2a,b, and c" with "\$5,333,333.33."

In witness whereof, the parties have caused duly authorized representatives to execute this Agreement

13. Sections 19.24.1 (Payment Bond) and 19.24.2 (Performance Bond) are hereby deleted.

on the dates set forth below,	300000 000 000 000 000 000 000 000 000
MOTOROLA SOLUTIONS/INC.	CITY OF AUSTIN
By: Signature	By: X Signature
Name: Edward Fuerst Printed Name	Name: Denise Lucis Printed Name
Title: M5551 Vice President	Title: Deputy Purchang Office
Date: /7 /1 /- / /	Date: 12/13/2012



## Amendment No. 13 to Contract No. S010222/S011253/S060120 for

Communications System Agreement for the 911 RDMT Radio Project between

Motorola Communications and Electronics, Inc.

and the City of Austin

- 1.0 This Amendment is for the trade-in of 541 used Motorola radios per the attached listing in exchange for 50 new Motorola CP200-XLS portable radios.
- 2.0 Motorola agrees to shred and recycle the trade-in radios.
- 3.0 The total Contract authorization is recapped below:

Term	Contract Amount for the term	Total Contract Amount
Original contract	\$73,962,244	\$73,962,244
Amendment No. 1: Changed contract language, no cost impact	N/A	
Amendment No. 2: Changed contract language, no cost impact	N/A	
Amendment No. 3: Increased the contract to upgrade the radio system infrastructure	\$4,385,132	\$78,347,376
Amendment No. 4: Increased the contract to upgrade the radio system operating software	\$8,056,000	\$86,403,376
Amendment No. 5: Incorporate documents regarding extension of system into Williamson County, revise project timeline, no cost impact	N/A	
Amendment No. 6: Increase the contract for the purchase of add-on equipment and services and extend the discount structure through 2015	\$1,789,098	\$88,192,474
Amendment No. 7: Increase the contract for the Bastrop/Lockhart expansion (\$6,392,528) and for the purchase of add-on equipment and services (\$1,987,930)	\$8,380,458	\$96,572,932
Amendment No. 8: Modify Project Schedule and Payment Terms for COPS 2007	No change	\$96,572,932
Amendment No. 9: Increase the contract for the purchase of additional equipment and services	\$1,271,000	\$97,843,932
Amendment No. 10: Increase the contract for the purchase of additional equipment and services	\$1,056,800	\$98,900,732
Amendment No. 11: Add subscriber radio equipment to contract	No additional funding required	\$98,900,732

Amendment No. 12: Infrastructure upgrade project, additional equipment and services	\$3,293,000	\$102,193,732
Amendment 13: Trade-in of radios	No additional funding required	\$102,193,732

4.0 By signing this Amendment the Contractor certifies that the Contractor and its principals are not currently suspended or debarred from doing business with the Federal Government, as indicated by the General Services Administration (GSA) List of Parties Excluded from Federal Procurement and Non-Procurement Programs, the State of Texas, or the City of Austin.

State of Texas, or the City of Austin.	Todalar Possiana (ana tana pana)
5.0 All other terms and conditions remain the same.	
BY THE SIGNATURES arrixed below, mendment No. 13 referenced contract.	3 is hereby incorporated into and made a part of the above
Signature: 4/1/1/1/1/1/1/1/1/1/1/1/1/1/1/1/1/1/1/1	Signed:
Printed Name: Edward Fuer +	Mick Osborne, Sr. Buyer Specialist
Authorized Representative Motorpla Solutions Sales & Service Dicelections	City of Austin
Motorola Soluions, Inc.	
6500 River Place Blvd., Building 7	
Austin, TX 78730	200
7/25/11	7/24:/11
Date	Date



# Contract No. S010222/S011253/S060120 for

# Communications System Agreement for the 911 RDMT Radio Project between

Motorola Communications and Electronics, Inc. and the City of Austin

- 1.0 Increase the contract in an amount not to exceed \$435,000.00 for the 7.7 and 7.9 infrastructure upgrade project per the Statement of Work dated March 29, 2011 and revised on April 4, 2011.
- 2.0 Increase the contract in an amount not to exceed \$2,858,000.00 for subscriber radio equipment, add-on radios for new positions and vehicles, replacement units, and related equipment and services.
- 2.0 The total Contract authorization is recapped below:

Term	Contract Amount for the term	Total Contract Amount
Original contract	\$73,962,244	\$73,962,244
Amendment No. 1: Changed contract language, no cost impact	N/A	
Amendment No. 2: Changed contract language, no cost impact	N/A	
Amendment No. 3: Increased the contract to upgrade the radio system infrastructure	\$4,385,132	\$78,347,376
Amendment No. 4: Increased the contract to upgrade the radio system operating software	\$8,056,000	\$86,403,376
Amendment No. 5: Incorporate documents regarding extension of system into Williamson County, revise project timeline, no cost impact	N/A	
Amendment No. 6: Increase the contract for the purchase of add-on equipment and services and extend the discount structure through 2015.	\$1,789,098	\$88,192,474
Amendment No. 7: Increase the contract for the Bastrop/Lockhart expansion (\$6,392,528) and for the purchase of add-on equipment and services (\$1,987,930)	\$8,380,458	\$96,572,932
Amendment No. 8: Modify Project Schedule and Payment Terms for COPS 2007	No change	\$96,572,932
Amendment No. 9; Increase the contract for the purchase of additional equipment and services	\$1,271,000	\$97,843,932
Amendment No. 10: Increase the contract for the purchase of additional equipment and services	\$1,056,800	\$98,000,732
Amendment No. 11: Add subscriber	No additional funding	\$98,900,732

radio equipment to contract	required	
Amendment No. 12: Infrastructure upgrade project, additional equipment and services	\$3,293,000	\$102,193,732

3.0 By signing this Amendment the Contractor certifies that the Contractor and its principals are not currently suspended or debarred from doing business with the Federal Government, as indicated by the General Services Administration (GSA) List of Parties Excluded from Federal Procurement and Non-Procurement Programs, the State of Texas, or the City of Austin.

4.0 All other terms and conditions remain the same.	
BY THE SIGNATURES affixed below, Amendment No. 12	is hereby incorporated into and made a part of the above-
referenced contract.	4.011 2 111
Signature: Glid Still	Signed: Myhr Dyhralohun (PV
Printed Name: Edward Fuersit	Mick Osborne, Sr. Buyer Specialist
Authorized Representative	City of Austin
Motorola Solutions Sales and Service U.P.	Purchasing Office
Motorola Communications and Electronics, Inc.	2. 3.2 days 4. 5 m. c.
6500 River Place Blvd., Building 7	

Date

Austin, TX 78730

6/23/11



to

Contract No. S010222/S011253/S060120

for

Communications System Agreement for the 911 RDMT Radio Project between

Motorola Communications and Electronics, Inc. and the City of Austin

1.0 Add the following subscriber radio equipment to the contract at a 20% discount from Motorola list price for members of the Regional Radio System:

APX	Mobile - Fire EMS- 700/800/HF/ Encryption / POP25
	Mobile - Police - 700/800/ Encryption / POP25
APX	Mobile - Base Non Public Safety - 700/800 / POP25
APX	Portable - Police/Fire/EMS - 700/800/VHF Enc/POP25

2.0 The total Contract authorization is recapped below:

Term	Contract Amount for the term	Total Contract Amount
Original contract	\$73,962,244	\$73,962,244
Amendment No. 1: Changed contract language, no cost impact	N/A	
Amendment No. 2: Changed contract language, no cost impact	N/A	
Amendment No. 3: Increased the contract to upgrade the radio system infrastructure	\$4,385,132	\$78,347,376
Amendment No. 4: Increased the contract to upgrade the radio system operating software	\$8,056,000	\$86,403,376
Amendment No. 5: Incorporate documents regarding extension of system into Williamson County, revise project timeline, no cost impact	N/A	
Amendment No. 6: Increase the contract for the purchase of add-on equipment and services and extend the discount structure through 2015	\$1,789,098	\$88,192,474
Amendment No. 7: Increase the contract for the Bastrop/Lockhart expansion (\$6,392,528) and for the purchase of add-on equipment and services (\$1,987,930)	\$8,380,458	\$96,572,932
Amendment No. 8: Modify Project Schedule and Payment Terms for COPS 2007	No change	\$96,572,932
Amendment No. 9: Increase the contract for the purchase of additional	\$1,271,000	\$97,843,932

equipment and services		
Amendment No. 10: Increase the contract for the purchase of additional equipment and services	\$1,056,800	\$98,900,732
Amendment No. 11: Add subscriber radio equipment to contract	No additional funding required	\$98,900,732

- 3.0 By signing this Amendment the Contractor certifies that the Contractor and its principals are not currently suspended or debarred from doing business with the Federal Government, as indicated by the General Services Administration (GSA) List of Parties Excluded from Federal Procurement and Non-Procurement Programs, the State of Texas, or the City of Austin.
- 4.0 All other terms and conditions remain the same.

4	
BY THE SIGNATURES affixed below, Amendment Noreferenced contract.	o. 11 is hereby incorporated into and made a part of the above
referenced contract.	IN Ch (
Signature: Alas Aid	Signed:
Printed Name: Faward Fuerst	Mick Osborne, Sr. Buyer Specialist
Authorized Representative	City of Austin
	Purchasing Office
Motorola Communications and Electronics, Inc.	2.0000000
6500 River Place Blvd., Building 7	
Austin, TX 78730	. 1
1	8/24/10
8/24/10	3/24/10
Date	Date



to

# Contract No. S010222/S011253/S060120

for

# Communications System Agreement for the 911 RDMT Radio Project between

Motorola Communications and Electronics, Inc. and the City of Austin

- 1.0 Increase the contract in an amount not to exceed \$1,056,800.00 for the purchase of subscriber radio equipment, add-on radios, system upgrades, replacement units, and related equipment and services. The total contract amount is not to exceed \$98,900,732.00.
- 2.0 The total Contract authorization is recapped below:

Term	Contract Amount for the term	Total Contract Amount
Original contract	\$73,962,244	\$73,962,244
Amendment No. 1: Changed contract language, no cost impact	N/A	
Amendment No. 2: Changed contract language, no cost impact	N/A	
Amendment No. 3: Increased the contract to upgrade the radio system infrastructure	\$4,385,132	\$78,347,376
Amendment No. 4: Increased the contract to upgrade the radio system operating software	\$8,056,000	\$86,403,376
Amendment No. 5: Incorporate documents regarding extension of system into Williamson County, revise project timeline, no cost impact	N/A	
Amendment No. 6: Increase the contract for the purchase of add-on equipment and services and extend the discount structure through 2015	\$1,789,098	\$88,192,474
Amendment No. 7: Increase the contract for the Bastrop/Lockhart expansion (\$6,392,528) and for the purchase of add-on equipment and services (\$1,987,930)	\$8,380,458	\$96,572,932
Amendment No. 8; Modify Project Schedule and Payment Terms for COPS 2007	No change	\$96,572,932
Amendment No. 9: Increase the contract for the purchase of additional equipment and services	\$1,271,000	\$97,843,932
Amendment No. 10: Increase the contract for the purchase of additional equipment and services	\$1,056,800	\$98,900,732

	suspended or debarred from doing business with t	the Federal Government, as indicated by the General Services in Federal Procurement and Non-Procurement Programs, the
	State of Texas, or the City of Austin.	
	4.0 All other terms and conditions remain the same.	
		t No. 10 is hereby incorporated into and made a
	part of the above references confiract.	0.0
	Signature: While Influence Signature:	Signed:
,	Printed Name: Edward Fuerst	Mick Osborne, Sr. Buyer Specialist
	Authorized Representative MSSI Vice President	City of Austin Purchasing Office
	Motorola Communications and Electronics, Inc.	The state of the s
	6500 River Place Blvd., Building 7 Austin, TX 78730	
	12-18-09	12/18/09
-	Date	Date



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# Contract No. S010222/S011253/S060120

for

# Communications System Agreement for the 911 RDMT Radio Project between

Motorola Communications and Electronics, Inc. and the City of Austin

- 1.0 Increase the contract in an amount not to exceed \$1,271,000.00 for the purchase of subscriber radio equipment, add-on radios, system upgrades, replacement units, and related equipment and services. The total contract amount is not to exceed \$97,843,932.00.
- 2.0 The total Contract authorization is recapped below:

Term	Contract Amount for the term	Total Contract Amount
Original contract	\$73,962,244	\$73,962,244
Amendment No. 1: Changed contract language, no cost impact	N/A	
Amendment No. 2: Changed contract language, no cost impact	N/A	27.00
Amendment No. 3: Increased the contract to upgrade the radio system infrastructure	\$4,385,132	\$78,347,376
Amendment No. 4: Increased the contract to upgrade the radio system operating software	\$8,056,000	\$86,403,376
Amendment No. 5: Incorporate documents regarding extension of system into Williamson County, revise project timeline, no cost impact	N/A	
Amendment No. 6: Increase the contract for the purchase of add-on equipment and services and extend the discount structure through 2015	\$1,789,098	\$88,192,474
Amendment No. 7: Increase the contract for the Bastrop/Lockhart expansion (\$6,392,528) and for the purchase of add-on equipment and services (\$1,987,930)	\$8,380,458	\$96,572,932
Amendment No. 8: Modify Project Schedule and Payment Terms for COPS 2007	No change	\$96,572,932
Amendment No. 9: Increase the contract for the purchase of additional equipment and services	\$1,271,000	\$97,843,932

3.0 By signing this Amendment the Contractor certifies that the Contractor and its principals are not currently suspended or debarred from doing business with the Federal Government, as indicated by the General Services Administration (GSA) List of Parties Excluded from Federal Procurement and Non-Procurement Programs, the State of Texas, or the City of Austin.

4.0 All other terms and conditions remain the same. BY THE SIGNATURES offixed below. Amendment No. 9 is hereby incorporated into and made a part of the above-referenced contract. Signature: Signed: Printed Name: Edward Fuebot Mick Osborne, Sr. Buyer Specialist Authorized Representative M301 Vice President & Director of Sales City of Austin Purchasing Office Motorola Communications and Electronics, Inc. 6500 River Place Blvd., Building 7 Austin, TX 78730 1-8-09 Date



to

# Contract No. S010222/S011253/S060120

for

# Communications System Agreement for the 911 RDMT Radio Project between

Motorola Communications and Electronics, Inc. and the City of Austin

- 1.0 Replace Section 4 (Project Schedule) and Section 9 (Payment Terms) from the original COPS 2007 Project Documentation with the attached, revised Sections 4 and 9.
- 2.0 The total Contract authorization is recapped below:

Term	Contract Amount for the term	Total Contract Amount
Original contract	\$73,962,244	\$73,962,244
Amendment No. 1: Changed contract language, no cost impact	N/A	
Amendment No. 2: Changed contract language, no cost impact	N/A	
Amendment No. 3: Increased the contract to upgrade the radio system infrastructure	\$4,385,132	\$78,347,376
Amendment No. 4: Increased the contract to upgrade the radio system operating software	\$8,056,000	\$86,403,376
Amendment No. 5: Incorporate documents regarding extension of system into Williamson County, revise project timeline, no cost impact	N/A	
Amendment No. 6: Increase the contract for the purchase of add-on equipment and services and extend the discount structure through 2015	\$1,789,098	\$88,192,474
Amendment No. 7: Increase the contract for the Bastrop/Lockhart expansion (\$6,392,528) and for the purchase of add-on equipment and services (\$1,987,930)	\$8,380,458	\$96,572,932
Amendment No. 8: Modify Project Schedule and Payment Terms for COPS 2007	No change	\$96,572,932

- 3.0 By signing this Amendment the Contractor certifies that the Contractor and its principals are not currently suspended or debarred from doing business with the Federal Government, as indicated by the General Services Administration (GSA) List of Parties Excluded from Federal Procurement and Non-Procurement Programs, the State of Texas, or the City of Austin.
- 4.0 All other terms and conditions remain the same.

BY THE SIGNATURES affixed below, Amendment No. 8 is hereby incorporated into and made a part of the above-referenced contract.

Motorola RDMT radio Amend #8

Signature:

Printed Name: Faward Fuerst
Authorized Representative

Mick Osborne, Sr. Buyer Specialist
City of Austin
Purchasing Office

Motorola Communications and Electronics, Inc.
6500 River Place Blvd., Building 7
Austin, TX 78730

Date

Signed:

Mick Osborne, Sr. Buyer Specialist
City of Austin
Purchasing Office

Date



#### Amendment No. 7 to Contract No. S010222/S011253/S060120 for

Communications System Agreement for the 911 RDMT Radio Project between

Motorola Communications and Electronics, Inc. and the City of Austin

- 1.0 Increase the contract in an amount not to exceed \$6,392,528.00 for the purchase of radio system infrastructure and subscriber radio equipment to expand the Austin/Travis County Regional Radio System to Bastrop County and to the City of Lockhart (COPS 2007 Project).
- 2.0 Incorporate the attached COPS 2007 Project Documentation into the contract. Documents are as follows:
  - 1. System Description
  - 2. Pre-DDR Equipment List
  - 3. Statement of Work
  - 4. Project Schedule
  - 5. Acceptance Test Plan
  - 6. Training Plan
  - 7. Warranty and Maintenance Plan (v2)
  - 8. Pricing Summary (v2)
  - 9. Payment Terms
- 3.0 Increase the contract in an amount not to exceed \$1,987,930.00 for the purchase of add-on radios and related equipment and services for City departments.
- 4.0 The total contract amount is increased to an amount not to exceed \$96,572,932.00
- 5.0 The total Contract authorization is recapped below:

Term	Contract Amount for the term	Total Contract Amount
Original contract	\$73,962,244	\$73,962,244
Amendment No. 1: Changed contract language, no cost impact	N/A	
Amendment No. 2: Changed contract language, no cost impact	N/A	
Amendment No. 3: Increased the contract to upgrade the radio system infrastructure	\$4,385,132	\$78,347,376
Amendment No. 4: Increased the contract to upgrade the radio system operating software	\$8,056,000	\$86,403,376
Amendment No. 5: Incorporate documents regarding extension of system into Williamson County, revise project timeline, no cost impact	N/A	
Amendment No. 6: Increase the contract for the purchase of add-on equipment and services and extend the discount structure through 2015	\$1,789,098	\$88,192,474
Amendment No. 7: Increase the	\$8,380,458	\$96,572,932

Motorola RDMT radio Amend #7

expansion (\$6,392,528) and for the purchase of add-on equipment and services (\$1,987,930)  6.0 By signing this Amendment the Contractor certifies that the Contractor and its principals are not currently suspended or debarred from doing business with the Federal Government, as indicated by the General Service Administration (GSA) List of Parties Excluded from Federal Procurement and Non-Procurement Programs, the State of Texas, or the City of Austin.  7.0 All other terms and conditions remain the same.  BY THE SIGNATURES office doelow, Amendment No. 7 is hereby incorporated into and made a poof the above referenced contract.  Signature:  Printed Name:  Signature:  Mick Osborne, Sr. Buyer Specialist City of Austin Purchasing Office  Date  City of Austin, Reviewed and Approved  Rick Fudge, Deput Purchasing Officer  Signature and Date	contract for the Bastrop/Lockhart	
suspended or debarred from doing business with the Federal Government, as indicated by the General Service Administration (GSA) List of Parties Excluded from Federal Procurement and Non-Procurement Programs, the State of Texas, or the City of Austin.  7.0 All other terms and conditions remain the same.  BY THE SIGNATURES attixed below. Amendment No. 7 is hereby incorporated into and made a poof the above reference of contract.  Signature:  Printed Name:  Printed Name:  Signed:  Mick Osborne, Sr. Buyer Specialist  City of Austin  Purchasing Office  Date  City of Austin, Reviewed and Approved  Rick Fudge, Deputy Pytichasing Officer  Signature and Date	purchase of add-on equipment and	
suspended or debarred from doing business with the Federal Government, as indicated by the General Service Administration (GSA) List of Parties Excluded from Federal Procurement and Non-Procurement Programs, the State of Texas, or the City of Austin.  7.0 All other terms and conditions remain the same.  BY THE SIGNATURES affixed below. Amendment No. 7 is hereby incorporated into and made a poof the above referenced contract.  Signature:  Printed Name:  Printed Name:  Printed Name:  One of Austin Purchasing Office  Date  City of Austin, Reviewed and Approved  Rick Fudge, Deputy Pytichasing Officer  Signature and Date		
BY THE SIGNATURES attixed below Amendment No. 7 is hereby incorporated into and made a poof the above referenced contract.  Signature:  Printed Name: Printed Name: Authorized Representative  Motorola Communications and Electronics, Inc. 6500 River Place Blvd., Building 7  Austin, TX 78730  Date  City of Austin, Reviewed and Approved  City of Austin, Reviewed and Approved  Rick Fudge, Deputy Purchasing Officer  Signature and Date	suspended or debarred from doing busi Administration (GSA) List of Parties Exc	iness with the Federal Government, as indicated by the General Services
of the above referenced contract.  Signature:  Printed Name: Edward Free Mick Osborne, Sr. Buyer Specialist City of Austin Purchasing Office  Motorola Communications and Electronics, Inc. 6500 River Place Blvd., Building 7 Austin, TX 78730  Date  City of Austin, Reviewed and Approved  Rick Fudge, Deputy Purchasing Officer  Signature and Date	7.0 All other terms and conditions remain th	ne same.
of the above referenced contract.  Signature:  Printed Name: Edward Free Mick Osborne, Sr. Buyer Specialist City of Austin Purchasing Office  Motorola Communications and Electronics, Inc. 6500 River Place Blvd., Building 7 Austin, TX 78730  Date  City of Austin, Reviewed and Approved  Rick Fudge, Deputy Purchasing Officer  Signature and Date	BY THE SIGNATURES officed below Am	endment No. 7 is hereby incorporated into and made a part
Printed Name: Edward Fuel Mick Osborne, Sr. Buyer Specialist Authorized Representative City of Austin Purchasing Office  Mick Osborne, Sr. Buyer Specialist City of Austin Purchasing Office  Date  Date  City of Austin Purchasing Office  City of Austin, Reviewed and Approved  Rick Fudge, Deputy Purchasing Officer  Signature and Date		onament new participation and made a part
Printed Name: Edward Fuel Mick Osborne, Sr. Buyer Specialist Authorized Representative City of Austin Purchasing Office  Mick Osborne, Sr. Buyer Specialist City of Austin Purchasing Office  Date  Date  City of Austin Purchasing Office  City of Austin, Reviewed and Approved City of Austin, Reviewed and Approved Rick Fudge, Deputy Purchasing Officer  Signature and Date	6/1/	1000
Authorized Representative  Motorola Communications and Electronics, Inc. 6500 River Place Blvd., Building 7  Austin, TX 78730  Date  City of Austin Purchasing Office  City of Austin Purchasing Office  City of Austin, Reviewed and Approved  City of Austin, Reviewed and Approved  Rick Fudge, Deputy Purchasing Officer  Signature and Date		Signed:
Motorola Communications and Electronics, Inc. 6500 River Place Blvd., Building 7 Austin, TX.78730  Date  Date  City of Austin, Reviewed and Approved  Rick Fudge, Deputy Purchasing Officer  Signature and Date		
Motorola Communications and Electronics, Inc. 6500 River Place Blvd., Building 7 Austin, TX 78730  Date  Date  City of Austin, Reviewed and Approved  Rick Fudge, Deputy Purchasing Officer  Signature and Date	Authorized Representative	
Date  Date  City of Austin, Reviewed and Approved  Rick Fudge, Deputy Purchasing Officer  Signature and Date	Material Communications and Electronics In	
Date  Date  City of Austin, Reviewed and Approved  Rick Fudge, Deputy Purchasing Officer  Signature and Date		ic.
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#### to Contract No. S010222/S011253/S060120 for

Communications System Agreement for the 911 RDMT Radio Project between

Motorola Communications and Electronics, Inc. and the

City of Austin

- 1.0 Increase the contract in an amount not to exceed \$1,789,098, with the total contract amount not to exceed \$88,192,474.
- 2.0 Extend the contract and associated discount structure through December 19, 2015.
- 3.0 Allow, through the execution of interlocal agreements with the City of Austin, other district, municipal, county and state entities to utilize the contract pricing for radios, other equipment, and services.
- 4.0 Establish Minority and Women Owned Business Enterprise (MBE/WBE) goals for this contract of 10% MBE and 6.70% WBE, to apply to both this contract and any interlocal agreements established as a result of item 3.0 above.
- 5.0 The total Contract authorization is recapped below:

Term	Contract Amount for the term	Total Contract Amount
Original contract	\$73,962,244	\$73,962,244
Amendment No. 1: Changed contract language, no cost impact	N/A	
Amendment No. 2: Changed contract language, no cost impact	N/A	
Amendment No. 3: Increased the contract to upgrade the radio system infrastructure	\$4,385 132	\$78,347,376
Amendment No. 4: Increased the contract to upgrade the radio system operating software	\$8,056,000	\$86,403,376
Amendment No. 5. Incorporate documents regarding extension of system into Williamson County, revise project timeline, no cost impact	N/A	
This Amendment No. 6. Increase the contract for the purchase of add-on equipment and services and extend the discount structure through 2015	\$1,789,098	\$88,192,474

- 6.0 By signing this Amendment the Contractor certifies that the Contractor and its principals are not currently suspended or debarred from doing business with the Federal Government, as indicated by the General Services Administration (GSA) List of Parties Excluded from Federal Procurement and Non-Procurement Programs, the State of Texas, or the City of Austin.
- 7.0 All other terms and conditions remain the same.

BY THE SIGNATURES affixed below, Amendment of the above-references contract	ent No. 6 is hereby incorporated into and made a pa
Printed Name: Edward Fuerst	Mick Osborne, Sr. Buyer Specialist
Authorized Representative	City of Austin
1,489-10-10-10-10-10-10-10-10-10-10-10-10-10-	Purchasing Office
Motorola Communications and Electronics, Inc.	
6500 River Place Blvd., Building 7	
Austin, TX 78730	12/-1
15/19/3000	12/19/06
Date	Date
	City of Austin, Reviewed and Approved
	City of Austin, Neviewed and Approved
	Rick Fudge, Deputy Purchasing Officer
	Le 20_ 12/19/06
	Signature and Date
	Digitator and Date

# AMENDMENT NO. 5

#### TO THE

# COMMUNICATIONS SYSTEM AGREEMENT FOR THE 911 RDMT RADIO PROJECT BETWEEN THE CITY OF AUSTIN, TEXAS AND MOTOROLA INC.

#### S010222/ S011253/S060120

This Amendment is made and entered into effective May 31, 2006, by and between Motorola Inc., a Delaware Corporation ("Motorola"), by and through the North America Group of its Commercial, Government and Industrial Solutions Sector ("CGISS") and the City of Austin ("City"), a Texas home-rule municipal corporation acting for itself and on behalf of other governmental entities who have executed the 800 MHz Trunked Voice Radio System Implementation Interlocal Agreement ("Interlocal Agreement").

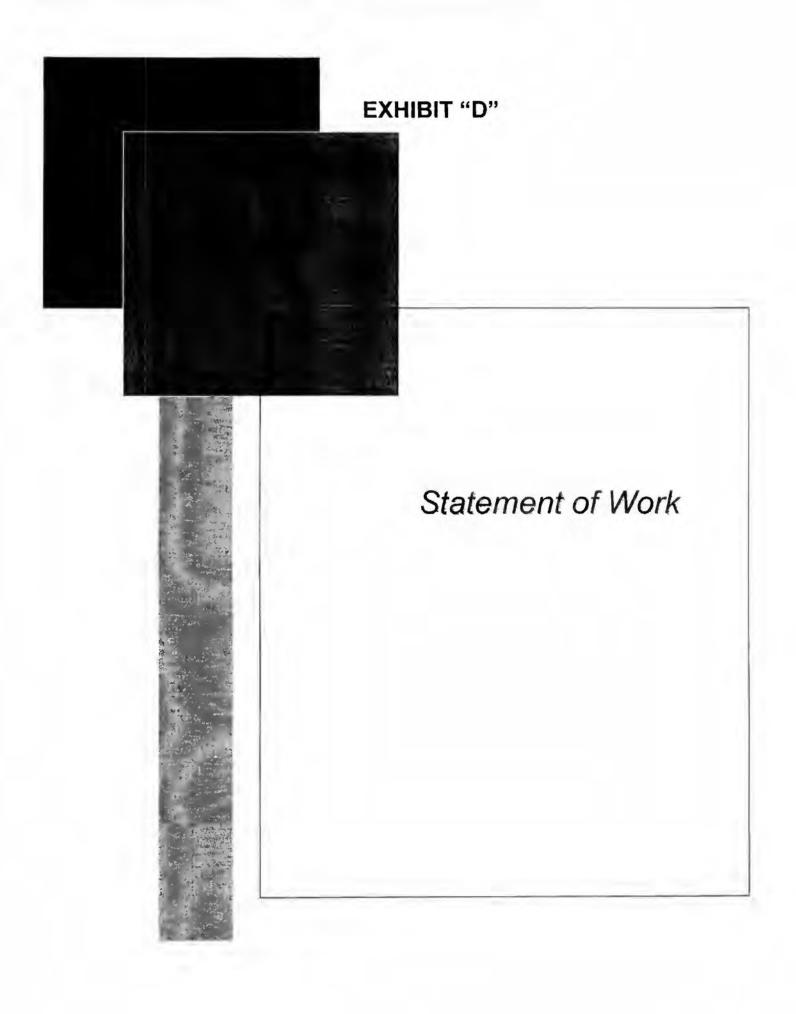
- 1.0 As provided for in the Interlocal Cooperation Agreement, dated April 27, 2006 between the City of Austin and Williamson County to extend the trunked radio system into Willamson County, Texas, and establish an interface between the Travis County and Williamson County portions of the system, the agreement is amended as follows:
  - 1.1 Incorporate the Public Safety Voice Radio Communications System Implementation Interlocal Cooperation Agreement between the City of Austin and Williamson County to extend the 800 MHz Trunked Voice Radio System to Williamson County, for informational purposes only and not binding on Motorola, as Exhibit I. The following documents, included in this Exhibit I, are incorporated into this Amendment No. 5:
    - 1.1.1 Incorporate the Community Oriented Policing Services (COPS) Statement of Work, reference Exhibit D of the Interlocal Agreement, into the Agreement.
    - 1.1.2 Incorporate the CWICS Expansion System Description and Acceptance Testing document, reference Exhibit E of the Interlocal Agreement, into the Agreement.
  - 1.2 Incorporate the revised timeline (Exhibit J), with milestone deliverables and payment schedule (Exhibit L), into Section 5.3 of the Agreement.
  - 1.3 The deadline for completing the COPS Statement of Work is January 4, 2008.
  - 1.4 The requirement for Motorola to maintain Payment and Performance Bonds, as established in section 19.24 of the Agreement, is extended to all work to be performed pursuant to this Amendment, at 100% of the price established for the Williamson County extension of the system.
  - 1.5 As previously established by Amendment 4, the not-to-exceed price of the Agreement is Eighty-Six Million Four Hundred Three Thousand Three Hundred Seventy-Six Dollars (\$86,403,376).

- 1.6 Williamson County is defined as "a political subdivision of the State of Texas and is located approximately 20 miles north of Austin. Adjoining counties are Travis, Burnet, Bell, Lee, Bastrop, and Milam".
- 1.7 Pricing for the COPS Grant Project radio system expansion to Williamson County is attached hereto as Exhibit K.
- 2.0. Motorola agrees to extend the current contract pricing discount for current production or replacement subscriber equipment models for an additional five (5) years beyond the term specified in Section 5.1.2, Option to Purchase, subject to approval of the Austin City Council. Under no event will this additional term become effective without express Council approval.
- 3.0 All other terms and conditions remain unchanged. This Amendment is part of the Agreement and all terms and conditions therein contained are applicable. The Agreement, all previous Amendments, and this Amendment shall collectively be referred to as "the Agreement."

IN WITNESS WHEREOF, Motorola and the City have caused this Amendment to be executed effective as of the day and year/first above written.

MOTOROLA, INC.: Signature:	CITY OF AUSTIN: Signature:
Name: Edward Fuerst	Name: MICK OFBERTSE
Title: MSSI Vice President + Director of Sales	Title: Sn. Byer Specialist
Date: 11-14-06	Date: 11/20/04

11 1



# STATEMENT OF WORK

This Statement of Work (SOW) describes the documentation to be furnished to the City of Austin, Texas, and the tasks to be performed by Motorola, its subcontractors, and the City of Austin to implement the solution described in this proposal and within the body of this document. It describes the actual work involved in installation, identifies the installation standards to be followed, and clarifies the responsibilities for both Motorola and the City of Austin during the project implementation. Specifically, this SOW provides:

- A summary of the phases and tasks to be completed within the project
- A list of the documents associated with the project
- A description of the responsibilities for both Motorola and the City of Austin
- The qualifications and assumptions taken into consideration during the development of this project

This SOW provides the most current understanding of the work required by both parties to ensure a successful project implementation. It is understood that this SOW is a working document, and that it will be revised as needed to incorporate any changes associated within the realm of Design Review (DR), and any other change that may occur during the execution of the project.

Note: Unless otherwise indicated from the context in which it is used, the word "system" will be used herein to refer to the compilation of the subsystems identified in the paragraph above, associated interfaces, and associated ancillary systems.



# 1.1 PHASES AND TASKS

Based on many years of experience, Motorola has developed a project methodology that identifies major project phases—
Contract/Project Initiation, Design Review, Order Processing, Manufacturing and Staging, Civil Work, Installation, System Optimization, Training, Acceptance Testing, and Project Finalization. Depending on the particular project, all or some of these phases may be required. Each phase follows a Work Breakdown Structure (WBS) that clearly identifies the work to be performed during this project.

WBS Element	WBS Name
1.1	Implementation Project
1.1.1	Contract/Project Initiation
1.1.2	Design Review
1.1.3	Order Processing
1.1.4	Manufacturing
1.1.5	Civil Work
1.1.6	Installation
1.1.7	System Optimization
1.1.8	Training
1.1.9	Acceptance Testing
1.1.10	Subscriber Installation
1.1.11	Project Finalization

Throughout the duration of this project, Motorola will provide the equipment and services within each phase as described within this SOW. Descriptions of the specific tasks associated with the individual phases are contained in the following sections.

# 1.1.1 Project Initiation

The implementation process will begin with the Project Initiation Phase. During this phase, the project teams from Motorola and the City of Austin will meet to begin the project.

This phase is considered complete when the Project Kickoff Meeting has been held with Motorola and the City of Austin in attendance and the project scope, schedule, and roles/responsibilities are discussed, agreed upon, and documented.

# 1.1.1.1 Identify Team and Administer Project

As the systems integrator, Motorola provides the resources and processes necessary to complete the tasks within this project. Motorola will designate a single individual as the program manager whose primary responsibility and authority will be to manage and administer this project to successful completion as defined within this change order. This individual is the Motorola point of contact for the City of Austin. The program manager will ensure that all objectives are met within schedule constraints, and provide timely reporting of the overall progress of the project via the refinement of the Project Schedule (DELIVERABLE 1), Project Status Reports (DELIVERABLE 2), Meeting Minutes (DELIVERABLE 3), and Action Item Logs (DELIVERABLE 4). In addition Motorola will ask that the City of Austin identify a single point of contact

to represent the City of Austin and be responsible for all the City of Austin signature approvals.

# 1.1.1.2 Conduct Project Kickoff Meeting

The project will be initiated with a Project Kickoff Meeting that includes key City of Austin and Motorola project team participants. The date, time, and location of the meeting will be mutually agreed upon between Motorola and the City of Austin. The objectives of this meeting include:

- Introduction of all project participants
- Review of the roles of the project participants to identify communication flows and decision-making authority between project participants
- Review of the overall project scope and objectives
- Review of the resource and scheduling requirements
- · Review of the project schedule to address any upcoming milestones or events
- Review of the team interaction, meetings, reports, milestone acceptance, and the City of Austin's participation in particular phases

Project schedules are integral to the management of the project and will be produced by the Motorola team to provide a timeline analysis for all phases of the project. The Project Schedule will emphasize all milestones and the critical path, which is essential for the successful completion of the project. The City of Austin and Motorola will mutually agree upon the Project Schedule to determine implementation tasks, priorities, and inter-dependences. This Project Schedule will provide the framework for task completion. Changes to the schedule outside of the mutually agreed upon tasks and completion dates can be accommodated through the change order process.

# 1.1.2 Design Review

After the Project Kickoff Meeting, Motorola and the City of Austin project teams will meet to review the proposed system design. The goal of this review is to achieve written agreement on the overall system design and deliverables. Various design documents will be presented for approval from the City of Austin. These documents will form the basis of the system that will be manufactured, assembled, staged, and installed. This review is not intended to redesign the system architecture or to re-evaluate any specifications previously reviewed and approved. However, if in the course of design review discussions, changes to the design are identified that are determined to be outside of the proposal scope, the changes can be accommodated through the change order process.

This phase is considered complete when all documentation deliverables associated with this phase have been delivered to the City of Austin and signed by the designated representative from the City of Austin.

#### 1.1.2.1 Conduct Site Evaluations

Motorola will conduct site evaluations in order to capture the site details of the system design and to determine site readiness. These evaluations will capture the viability of using each site from a personnel safety, system design and installation standpoint, as well as from a physical capacity standpoint to ensure that the sites are able to accommodate the proposed equipment. This task may include the testing of existing equipment that will interface with the proposed equipment and will include the performance of a preliminary suitability review for each site included in this proposal.

Motorola will prepare a Site Evaluation Report (DELIVERABLE 5) that summarizes the findings of the site evaluations. The report will include awareness of any personnel safety issues and any site preparation recommendations to the City of Austin to aid in providing a suitable environment for system installation. If corrective design action is required or recommended, Motorola can be contracted, through the change order process, to provide a suitable environment for system installation.

# 1.1.2.2 Conduct Design Review

A Design Review (DR) Meeting will be held with the City of Austin to ensure that all customer requirements are shown in the necessary customer approved documents and that the design meets those requirements. During this meeting, Motorola and the City of Austin will review the operational requirements and the impact of those requirements on various equipment configurations. The goals of this meeting are to establish a firm baseline for the system design, identify any special product requirements and their impact on system implementation, and review the Acceptance Test Plan (DELIVERABLE 6). The system design is "frozen" at this point, in preparation for the subsequent phases of the project such as Order Processing and Manufacturing. In addition, a discussion of the Cutover Plan and methods to document a detailed procedure for cutover will begin at this meeting.

The results of the DR Meeting will be documented in the Design Documentation (DELIVERABLE 7) that will include the updated System Description, updated Equipment List, and system drawings or other documents applicable to the project.

# 1.1.3 Order Processing

The completion of the Design Review phase, resulting in a final design and equipment list that includes any modifications as identified during the DR Meeting, triggers the onset of the Order Processing Phase.

As part of this process, Motorola also confirms the City of Austin provided secure storage location(s) for this equipment.

This phase will be deemed complete when the equipment order is bridged to the manufacturing facility.

# 1.1.4 Manufacturing

Based on the equipment order, Motorola will manufacture and/or procure the items necessary for the system. For Motorola manufactured equipment, the manufacturing facility will test each subsystem from its base kit or module level up to the complete subsystem at factory staging. In addition to the individual tests applied to all units shipped, Motorola's Product Quality Engineering Department performs additional tests on periodic samples. These additional tests include performance tests under environmental extremes (e.g., temperature, humidity, vibration, etc.).

This phase will be deemed complete when the equipment is ready to be shipped to the City of Austin for field installation and testing

## 1.1.5 Civil Work

Civil work is not included as part of this offering. Therefore, no tasks are associated with this phase.

#### 1.1.6 Installation

Once the equipment is received at the secure location designated by the City of Austin, Motorola will install the equipment per the approved design documentation. During field installation of the equipment, any required changes to the installation will be noted and included with the final "as-built" documentation of the system. The "as-built" documents will be an update to the Austin/Travis County Regional Radio System (RRS) System manual.

This phase will be deemed completed when all equipment has been installed at the location(s) designated by the City of Austin.

#### 1.1.6.1 Manage Receipt of Equipment

Motorola will ensure that all equipment is sent to a customer secured storage location designated by the City of Austin, coordinate the receipt of all equipment with the City of Austin point of contact, and inventory all equipment.

# 1.1.6.2 Install Equipment

Motorola will install the equipment included in this project in the facilities provided by the City of Austin. Specifically, Motorola

- Will bond the supplied equipment to the site ground system in accordance with the Motorola document Standards and Guidelines for Communication Sites (R56) (DELIVERABLE 8).
- Will install system equipment as specified by the Equipment List, System Description, and Customer Approved Floor Plan layouts
- Will not remove or relocate existing equipment
- Will not dispose of existing equipment
- CWICS Prime Simulcast Site
  - Austin-CWICS will need to provide a new shelter at the Prime Simulcast Site
  - Motorola will run power from the Austin-CWICS provided electrical panel in the new Austin-CWICS provided shelter to the Motorola provided DC power system
  - Austin-CWICS will provide a conduit from the old Prime Simulcast Shelter to the new Austin-CWICS provided Prime Simulcast shelter.
  - Motorola will run T1 cables from the microwave in the existing shelter, through the Austin-CWICS provided conduit, to the new Austin-CWICS provided shelter for the site links.
  - Motorola will connect existing environmental site alarms to the Motorola provided MOSCAD equipment via Austin-CWICS provided conduit between the existing and new shelters. Motorola provided sensors and/or environmental alarms are not included in this proposal.
  - Motorola provided equipment will be monitored per the system description.
  - Motorola will install, bolt, and cable Motorola provided equipment in the Austin-CWICS provided shelter
- CWICS Remote Simulcast and Console Sites

- Austin-CWICS will provide shelters and installation locations that are R56 ready with adequate space, power, HVAC, cable trays, conduit, etc. including R56 ground connection points and AC power outlets at the dispatch operator positions.
- Relocation and removal of existing material or equipment is the responsibility of the Customer
- Motorola will run power from the Austin-CWICS provided electrical panel in the existing Austin-CWICS provided shelter to the Motorola provided DC power system
- Motorola will install, bolt, and cable Motorola provided equipment in the Austin-CWICS provided shelter
- Motorola will connect existing environmental site alarms to the Motorola provided MOSCAD equipment. Motorola provided sensors and/or environmental alarms are not included in this proposal.
- Motorola provided equipment will be monitored per the system description.
- Customer will provide UPS and/or any backup power at the Dispatch Centers

## CTECC Master Site

- Austin will provide space and electrical outlet drops to the location of the new master site equipment racks.
- Relocation and removal of existing material or equipment is the responsibility of the Customer

The installation pricing assumes that the existing building facilities have sufficient heating, ventilation and air conditioning (HVAC), space, necessary power and back-up power, along with required cable routing facilities to interconnect the hardware. Facility improvements and/or temporary installations of equipment have not been included in this proposal. If desired, Motorola can provide the City of Austin with such pricing after visiting the site to determine the scope of work involved.

# 1.1.7 System Optimization

Prior to applying power to the equipment, a site evaluation report will be created to verify that the installed equipment meets or exceeds the requirements as defined in the Motorola document Standards and Guidelines for Communication Sites (R56).

Upon completion of the installation process, the system will have power applied and will then be optimized by Motorola personnel under the direction of the program manager.

This phase will be deemed complete when Motorola has completed the system optimization is complete.

# 1.1.7.1 Configure, Optimize, and Program Equipment

Motorola will verify that all equipment is operating properly and that all electrical and signal levels are properly set once installation in the field is complete. Motorola and its subcontractors will optimize each subsystem individually. Audio and data levels will be checked to verify factory settings. Communication interfaces between devices will be verified for proper operation.

City of Austin is responsible for any mass entries of talkgroups or IDs in the system database.

# 1.1.7.2 Remove/Dispose of Equipment and Debris

Motorola will remove and dispose of any packaging or debris that is a result of the delivery, installation, or site improvements provided by Motorola. Existing equipment will not be removed or relocated by Motorola. The City of Austin has the responsibility for equipment relocation, removal, and/or transportation and disposal of removed equipment.

# 1.1.8 Training

The CWICS end user total satisfaction is directly related to the technical and operational efficiency of the new system. These efficiencies are only realized when each discipline within CWICS is fully trained to properly operate, administer, and maintain the system.

This proposal contains end user MCC7500 dispatch training for Williamson County, Georgetown, Cedar Park, and Round Rock. The pricing is based upon the training plan that is an appendix to this SOW. Motorola will work with CWCIS and the City of Austin to review this training. To document the outcome of the training needs, Motorola will provide the City of Austin with a Training Plan (DELIVERABLE 9) and associated course materials (DELIVERABLE 10).

This phase will be deemed complete upon the approval of the Training Plan by the City of Austin, and the delivery of the training by Motorola or its subcontractor.

# 1.1.9 Acceptance Testing

All tests will be performed as described in the Acceptance Test Plan, which will be reviewed at the Design Review. During acceptance testing, the system will be tested and the results documented as defined in the Acceptance Test Plan. This phase is considered complete when the City of Austin acknowledges successful completion of the procedures by signing an Acceptance Testing Certificate.

# 1.1.9.1 Review Acceptance Test Procedures

Motorola will review any system testing that the City of Austin wants performed that is not specified in the Acceptance Test Plan and documented in the test procedures. Additional tests may represent a change in the project's scope and may result in a change order to address the supplemental costs to perform the extra tests.

# 1.1.9.2 Conduct Field Acceptance Test

Motorola will conduct field acceptance testing based upon the acceptance test documents provided by Motorola. This testing is meant to test the hardware, software, and functionality of the system. City of Austin or CWICS designee representatives have the option to witness or to not witness the conduct of the field acceptance test. City of Austin and CWICS representatives are encouraged to witness field testing in order to gain a better understanding of the system and test process.

Resolutions to any deficiencies found during testing will be agreed upon and documented. If the documented deficiencies do not prevent productive operational use of the system, then the test will be deemed complete. Motorola will remain responsible for the resolution of any documented deficiencies.

#### 1.1.9.3 Conduct Coverage Acceptance Test

Motorola will conduct coverage acceptance testing based upon the test documents provided by Motorola. City of Austin or CWICS designee representatives have the option to witness or to not witness the conduct of the coverage acceptance test. City of Austin representatives are encouraged to witness coverage testing in order to gain a better understanding of the system and test process.

Resolutions to any deficiencies found during testing will be agreed upon and documented. If the documented deficiencies do not prevent productive operational use of the system, then the test will be deemed complete. Motorola will remain responsible for the resolution of any documented deficiencies.

# 1.1.9.4 Accept System

Upon successful completion of acceptance testing, the City of Austin or designee and Motorola will sign a Subsystem Acceptance Certificate.

Subsystem Acceptance will occur upon successful completion of the Acceptance Tests. Upon Acceptance, the Parties will memorialize this event by promptly executing a Subsystem Acceptance Certificate. If the Acceptance Test Plan includes separate tests for individual Subsystems or phases of the Implementation, acceptance of the individual Subsystem or phase will occur upon the successful completion of the Acceptance Tests for the Subsystem or phase, and the Parties will promptly execute an acceptance certificate for the Subsystem or phase. If the Customer believes the System has failed the completed Acceptance Tests, Customer will provide to Motorola a written notice that includes the specific details of the failure. If the Customer does not provide to Motorola a failure notice within thirty (30) days after completion of the Acceptance Tests, Subsystem Acceptance will be deemed to have occurred as of the completion of the Acceptance Tests. Minor omissions or variances in the System that do not materially impair the operation of the System as a whole will not postpone Acceptance or Subsystem acceptance, but will be corrected according to a mutually agreed schedule.

Customer acknowledges that Motorola's ability to perform its implementation and testing responsibilities may be impeded if Customer begins using the System before Acceptance. Therefore, Customer will not commence Beneficial Use before Acceptance without Motorola's prior written authorization, which will not be unreasonably withheld. Motorola is not responsible for System performance deficiencies that occur during unauthorized Beneficial Use. Upon commencement of Beneficial Use, Customer assumes responsibility for the use and operation of the System, and the Subsystem Acceptance is complete.

Subsystem Warranty commences with Subsystem Acceptance.

Change Order Acceptance will occur after Subsystem Acceptance, when the agreed upon final punchlist is complete, and the system manual has been provided to Customer. The Customer shall identify items for the final punchlist within 10 days of Subsystem Acceptance. When Change Order Acceptance occurs, the parties will promptly memorialize this final event by so indicating on the Change Order Acceptance Certificate.

#### 1.1.10 Subscriber Installation

There are no control stations or subscribers provided or installed as part of this offering. Therefore, no tasks are associated with this phase.

# 1.1.11 Project Finalization

The Project Finalization phase ensures that all criteria for Change Order Acceptance have been met.

#### 1.1.11.1 Resolve Punchlist Items

Motorola will work with the City of Austin to resolve punchlist items documented during the Acceptance Testing Phase and any other phase during project implementation to ensure that all the criteria for Change Order Acceptance have been met.

# 1.1.11.2 Warranty Support

Prior to commencement of warranty, Motorola will provide an updated RRS Customer Support Plan (DELIVERABLE 16) detailing the support.

The additional RRS CWICS subsystems will be under warranty support. The existing RRS Austin/Travis County equipment, that will be upgraded, will under support of the existing RRS maintenance contract.

This task will be deemed complete when service information has been delivered to the City of Austin.

# 1.1.11.3 Conduct System and Project Readiness Review

During this task, Motorola conducts a System and Project Readiness Review to obtain concurrence from all Motorola functional groups and the City of Austin that

- The factors and plans necessary for the high quality and reliability of the system, its components, installation, testing and training, have been addressed and successfully completed.
- The system is ready for beneficial use (cut-over).
- The project is evaluated and assessed to identify any issues that may affect the satisfaction of the end users of the system.

# 1.2 PROJECT DOCUMENTATION

Services, equipment, software and documentation are several types of project deliverables Motorola provides as part of this project. Services are specified within this SOW and the equipment is defined within the Equipment List. The documentation and drawings to be developed and delivered as part of this project are described below.

Motorola develops documentation and drawings of the system not only to assist with the implementation of the project, but also to provide the City of Austin with reference materials that can be used for training, as a basis for future system upgrades, and even disaster recovery. For these reasons, Motorola creates and updates documentation and drawings during the implementation of the project.

Table 1: Project Documentation.

#	Title	Description	Qty	Format Type/ Delivery	
1.	Project Schedule	Schedule This is the schedule for the project that is completed in support of the Project Kickoff Meeting.		Electronic/Email	
2.	Project Status Reports/ Schedule Updates	These reports capture the status of the project and will be provided on a basis that is mutually agreed upon by Motorola and the City of Austin.	1	Electronic/Email	
3.	Meeting Minutes	Meeting Minutes capture the results of the formal meetings held as part of this project such as the Design Review.	1	Electronic/Email	
4.	Action Item Logs	Action Item Logs provide a description of outstanding items and the name of the individual responsible for resolving the action item.	1	Electronic/Email	
5.	Site Evaluation Report	This report includes recommendations for site preparation so that a suitable environment for installation of the system can be obtained.	đ	Electronic/Email	
6.	Acceptance Test Plan			Electronic/Email	

#	Title	Description	Qty	Format Type/ Delivery	
7.	Design Documentation	The items included within this proposal are further refined and updated to reflect the "as-built" description of the system. This documentation may include documents such as System Description, system drawings, Equipment List, site connectivity, power requirements, etc. The final information is included as part of the System Manual.	-1	Electronic/Email	
8.	Standards and Guidelines for Communication Sites (R56)	This is a site standard recognized in the industry that is provided as reference for the City of Austin.	1	Electronic/Email	
9.	Training Plan	If training is provided as part of this proposal, the Training Plan outlines the details of the training to be provided as part of the project.	1	Electronic/Email	
10.	Training Course Materials	If training is provided as part of this proposal, these documents contain the information to be delivered during the training class.	1 per class attendee	Hardcopy	
11.	Acceptance Test Procedures	Acceptance Test Procedures are included in this proposal and they are used to perform acceptance testing.	1	Electronic/ CD-ROM	
12.	Fleet Maps and Programming Templates	Subscribers are not provided as part of this proposal, therefore templates are not included.	4	Electronic/Email	
13.	System Manual	A document that contains the final versions of the System Description, Equipment List, drawings, Acceptance Test Procedures, programming templates, and Customer Support Plan.	2.	Electronic/CD ROM	
14.	System Manual Licenses and Readers	The software required to view the electronic system manuals.	2	Electronic/CD ROM	

#	Title	Description	Qty	Format Type/ Delivery		
15.	Equipment Manuals	These are the manuals provided by the manufacturer(s) for the equipment that was supplied as part of this project.	As received	As received		
16.	Customer Support Plan	This document outlines the plan for customer support during the warranty period.	N/A	Electronic/CD ROM (provided as part of System Manual)		
17.	Cut Over Plan	This plan describes the details associated with system cut over.	1	Electronic/ CD-ROM		

#### Notes:

- Hardcopy Format: Printed documentation that may be delivered in person, U.S. mail, Fed Ex, UPS, or any other carrier.
- b. Electronic Format: Documentation that is in an electronic format and can delivered via Email, diskette, and/or CD ROM.

## 1.3 CUSTOMER RESPONSIBILITIES

A successful project requires responsibilities to be managed by both Motorola and the City of Austin. Motorola and the City of Austin responsibilities are outlined throughout this proposal. The information contained within the Equipment List and work defined in this SOW is based on the understanding that certain tasks will be performed by the City of Austin. These tasks are enumerated below to detail the tasks that are to be completed by the City of Austin in order to successfully complete the implementation.

- Provide Primary Point of Contact: The City of Austin needs to identify an individual as a primary point of contact who will work with the Motorola program manager.
- Complete Project Scheduled Tasks: The City of Austin needs to ensure that
  tasks assigned to them as agreed upon during the Project Kickoff Meeting are
  completed on a timely basis.
- Provide Internal Grounding Requirements for Site Development and Preparation: The City of Austin shall provide Motorola with detailed electrical drawings of the internal grounding system. The electrical drawings shall contain enough detail for Motorola to accurately determine if the internal grounding system meets the necessary requirements.

- 4. Provide External Grounding Requirements for Site Development and Preparation: The City of Austin shall provide Motorola with detailed electrical drawings of the grounding electrode system. The electrical drawings shall contain enough detail for Motorola to accurately determine if the grounding electrode system meets the necessary requirements.
- Perform Communication Site Upgrades: The City of Austin needs to ensure that site upgrades, as identified in the Site Evaluation Report, are completed within the Project Schedule time frame.
- 6. Upgrade Existing Communication Network and Equipment: The City of Austin needs to ensure that recommendations to upgrade/modify existing legacy communication system networks and equipment are reviewed and are completed within the Project Schedule time frame. These recommendations are made to ensure compatibility with new equipment and optimal application performance.
- Acquire Site Location: The City of Austin needs to obtain locations for sites and towers.
- Grant Site Access: The City of Austin needs to provide a letter to all
  owners/managers of sites and provide any keys or other necessary items to
  allow Motorola or third party personnel to enter all sites within this proposal.
- 9. Ensure Personnel Safety: The City of Austin needs to provide the Motorola program manager with safety rules during the Project Kickoff Meeting. These rules must be followed during the integration phase of this project. The Motorola program manager will also share Motorola's Safety Plan as found in Motorola's Field Operation Safety Manual. Motorola will conduct regular periodic inspections of all active job sites to ensure strict compliance with this Safety Plan as well as any safety rules set forth by the City of Austin.
- 10. Assist with Site Access: Motorola may require assistance traveling to sites as a result of impassable roads or difficult to access sites such as those located at mountaintops. The City of Austin needs to provide transportation to these sites if required.
- 11. Identify Location for Secure Equipment Storage: The City of Austin will need to identify the secure location for equipment storage during the Project Kickoff Meeting. This secure location will be used as the "ship to" address for the equipment and will be used to warehouse the equipment as the sites are being prepared.
- Provide Secure Storage of Equipment: The City of Austin is responsible for the secure storage of all equipment.
- 13. Provide Documentation of Existing Equipment: The City of Austin will need to provide documentation of existing system(s), sites, and interfaces.

- Documentation may be, but is not limited to, equipment manuals, drawings, and equipment lists.
- 14. Review Documentation: The City of Austin needs to review project documentation as it is received to provide feedback for appropriate and timely discussions and or changes. Documentation includes the Project Schedule, System Design, Training Plan and course materials, Acceptance Test Plans, Acceptance Test Procedures, and other deliverables as listed in Table 1.
- 15. Assume Responsibility for Third Party Equipment, Software, or Services: Third party services and/or equipment contracted by the City of Austin are the responsibility thereof. Motorola has responsibility for all third party services provided by Motorola under this proposal.
- 16. Ensure Performance Standards of the City of Austin-provided Site Connectivity Equipment: The connectivity performance standards will be included in the Design Documentation developed during the Design Review Phase. Motorola may test for compliance of the connections prior to commencing installation.
- Coordinate Schedule for Installation, Acceptance Tests, and Cutover: The City of Austin will provide times and dates of availability to participate in these events.
- 18. Decommission and Remove Existing Equipment: The City of Austin has the responsibility for the relocation, decommission, removal, and/or transportation of existing equipment.
- 19. Provide Permits, Licenses, and Structural Analyses: The City of Austin shall provide all permits and licenses related to frequencies, antenna installation, site upgrades and/or buildings. Motorola will provide structural analysis of the four existing CWICS towers, however, if any tower upgrades are required, it is the responsibility of City of Austin.
- 20. Support Integration, Optimization, and Testing: The City of Austin shall provide and install all communication lines/equipment that are not Motorola-provided deliverables and needs to provide all required liaison support with the agencies and vendors under their jurisdiction.
- 21. Communicate Project Changes: The City of Austin needs to communicate schedule changes for tasks or phase events, and/or changes to training dates to the program manager to avoid additional costs.

# 1.4 SITE REQUIREMENTS AND DESIGN ASSUMPTIONS

Motorola has developed a comprehensive solution contained within this proposal with the best intentions of satisfying the needs of the City of Austin. Certain assumptions were made in order for Motorola to design this system. The following is a list of site requirements and design assumptions for the system.

#### 1.4.1 Site Development and Preparation

Prior to equipment installation, Motorola will perform a site evaluation to determine if the site is ready to house the equipment, based on the requirements to install new equipment. Motorola can be contracted to engineer and/or implement any necessary corrections discovered during this site evaluation.

The site ready requirements Motorola uses are based on the <u>Standards and Guidelines</u> for <u>Communication Sites</u> (R56) is a compilation from numerous technical authorities including, but not limited to the Telecommunications Industry Association (TIA), the Institute of Electrical and Electronic Engineers (IEEE), the American National Standards Institute (ANSI), and the <u>National Electrical Code</u>® (<u>NEC</u>®). It is intended to define site requirements to ensure personnel safety and provide an environment for proper equipment operation.

#### 1.4.1.1 Grounding Requirements

To increase personnel safety and allow Motorola to provide equipment warranty, the site shall meet the grounding requirements of the NEC® and the Motorola document Standards and Guidelines for Communication Sites (R56). This includes an interconnection to all other grounding electrodes and utility grounds at the site, therefore forming a single grounding electrode system. In order to ensure a protective environment for the Motorola system, all equipment at the site, that is not part of this project, should also be installed correctly.

The single point ground system is comprised of both internal and external components, which are bonded together, along with all other grounds at the site, to form the overall site grounding system.

Internal - A single point ground system is required for all fixed equipment supplied under this contract. The single point ground system shall include an internal master ground point and sub-system ground points, when applicable, located within three feet of the Motorola supplied equipment. The internal master ground point shall serve as the single connection of all internal grounding to the external grounding electrode system.

The City of Austin shall provide Motorola with detailed electrical drawings of the internal grounding system. The electrical drawings shall contain enough detail for Motorola to accurately determine if the internal grounding system meets the necessary requirements.

■ External - An external grounding electrode system that is designed and installed in accordance the NEC® and the Motorola document, Standards and Guidelines for Communication Sites (R56), is also required. The grounding electrode system shall have a design goal of five (5) ohms or less that shall be met whenever possible and/or practical. The grounding electrode system shall include an interconnection to all other grounding electrodes and utility grounds at the site, therefore forming a single grounding electrode system.

The City of Austin shall provide Motorola with detailed electrical drawings of the grounding electrode system. The electrical drawings shall contain enough detail for Motorola to accurately determine if the grounding electrode system meets the necessary requirements.

#### 1.4.1.2 Transient Voltage Surge Suppression

To increase personnel safety and allow Motorola to provide equipment warranty, the site shall meet the Transient Voltage Surge Suppression (TVSS) requirements of the NEC® and the Motorola document, Standards and Guidelines for Communication Sites (R56). Transient voltage surge suppression for telephone circuits, AC power, radio frequency (RF) cabling, and all other applicable external connections and utilities shall exist which are required to meet the Motorola document, Standards and Guidelines for Communication Sites (R56).

#### 1.4.1.3 Electrical Installation

Sites shall have an electrical service and electrical wiring that meets the requirements of the <u>NEC</u><sup>®</sup>, the Motorola document, <u>Standards and Guidelines for Communication</u> <u>Sites</u> (R56), as well as all other applicable city, county, and state requirements.

#### 1.4.1.4 Electrical Capacity

Sites shall have an electrical service (AC, DC, UPS, generator, etc.) with the necessary capacity to supply power to the equipment associated with this proposal. Critical equipment items will require dedicated circuits as defined by the engineering Design Documentation.

#### 1.4.1.5 Equipment Space

Motorola will review equipment space requirements with the City of Austin to ensure sufficient installation space and compliance with the Motorola document, <u>Standards</u> and <u>Guidelines</u> for Communication Sites (R56).

#### 1.4.1.6 Environmental Conditions

Sites shall have adequate environmental controls to meet the Heating, Ventilation, and Air Conditioning (HVAC), and humidity requirements, as defined in the Motorola document, Standards and Guidelines for Communication Sites (R56). The sites shall be free of hazardous materials such as flammables, combustibles, asbestos, etc. Motorola would be pleased to provide equipment specifications as required to the City of Austin for building environmental control sizing and design. Meeting environmental control requirements is necessary for the Motorola warranty as well as third party warranties.

#### 1.4.1.7 Site Connectivity

During the Design Review (DR) Motorola will supply the City of Austin with the minimum acceptable performance specifications for microwave, fiber, or copper links. A demarcation point will also be established to define the connection point between the Motorola supplied equipment and the City of Austin supplied links. Motorola will perform a test, which will verify site link performance prior to the interconnection of the Motorola supplied equipment to the link equipment.

#### 1.4.1.8 Antenna Installation

The City of Austin shall provide the necessary antenna mounting structures (tower installation, roof mount, parapet mount) and each shall be designed for the intended application. The antenna mounting structure shall support the antenna, meet wind and ice load requirements, and provide sufficient room for the necessary antenna installation. Motorola can be contracted to design, supply, and install the antenna mounting structure.

#### 1.4.1.9 Licenses and Certifications

The City of Austin shall be responsible for all FCC licenses, building permits, electrical permits, environmental permits, licensed engineering drawings, and all other necessary approvals.

#### 1.4.2 Site Inter-connection Specifications

The following information is required for the site inter-connection specifications in the areas of Bit Error Rate, clocking, DSX-1 inter-connection and four-wire receiver site connections.

#### 1.4.2.1 TI Specifications

When ordering dedicated T1 transmission media from a common carrier or if the Customer provides links from their private system, the circuit must adhere to the following specifications. The first four specifications contain the information needed by a common carrier. Motorola systems require the remaining specifications for satisfactory operation.

- Availability: In service and usable 99.999% of the time; except during prearranged maintenance periods
- Line Coding: B8ZS
- Signaling: The T1 time slots must be set for "clear channel" operation (no signaling)
- Framing Format: ESF (Extended Superframe)
- Bit Error Rate: 1x10-6
- T1 Network clocking: The carrier should provide a Stratum 2 master clock source
- Propagation Delay: T1 propagation delay between any two sites must be less than 5 milliseconds.
- Compression: None
- Lines should be a dry line (no -48 Volts present).

#### Clocking

All DS-1 line rates must be traceable back to a primary reference source, a common clocking standard with a Stratum Level of 2 or better.

The frame slip rate cannot exceed one frame slip per 6 days.

The clocking standard must have a fail-safe backup to prevent the system from going into a "free running" mode.

The clocking standard must have reverting capabilities. If the primary clock fails, a backup clock takes over operation. When the primary clock returns to service, the system must revert back to the primary clock automatically.

#### 1.4.2.2 Four-wire Receiver Site Connections

The connections to the remote sites require specifications on the order of AT&T Type 3002 or Service Type 5 conditioned four-wire lines. The following is a partial list of the Type 3002 specifications:

Insertion Loss @ 1 kHz: 16 dB

Loss Variation @ 1 kHz

Long-term: +/- 4 dB

Short-term: +/- 3 dB

Bandwidth: 2700 Hz (300-3000 Hz)

Frequency Response (ref. 1 kHz)

500-2500 Hz: loss, -2 to +8 dB

300-3000 Hz: loss, -2 to +12 dB

Delay Distortion

800-2600 Hz: 1750 microseconds

Max. Ave. Input Signal Level:0 dBm at Network Interface

Max. Test Tone Level: 0 dBm at Network Interface

Frequency Shift: +/- 5 Hz

Phase Jitter: less than 10 degrees

#### 1.4.3 Interference

Motorola is not responsible for interference caused or received by the Motorola provided equipment except for interference that is directly caused by the Motorola provided transmitter(s) to the Motorola provided receiver(s). Should the City of Austin's system experience interference, Motorola can be contracted to investigate the source and recommend solutions to mitigate the issue.

# **APPENDIX - TRAINING PLAN**

## 1.50VERVIEW

Motorola's Learning Services organization dedicates itself exclusively to offering the most comprehensive training available for Motorola's advanced equipment to fully realize the equipment's potential. From sophisticated training needs analyses to ongoing training throughout the life cycle of your product or system, we can help ensure that your investment in training today is an investment for your future.

Our training methodology includes knowledgeable instructors, well-designed courseware, lab activities, and system hardware and software that closely parallels your operating environment and that is integrated with proper system documentation. This methodology is based upon several key criteria:

- Course design is driven by an analysis of learner needs and focuses on how-to rather than theory.
- Learning objectives are based upon what learners need to accomplish on the job and focus on specific applications.
- Hands-on lab opportunities using customer-specific job aids are incorporated into training to maximize the transfer of skills to the job and the retention/reuse of information.

Motorola offers both train-the-trainer and end-user training. Students can attend training at one of our training centers or instructors can come to your site. In conjunction with or in addition to instructor-led training, we can provide self-study/e-learning programs in which students follow a computer-based training module on CD-ROM or other media.

# PROPOSED COURSES

In the process of assessing your training needs, Motorola has identified the following courses to achieve your training goals. Inserted within the matrix are course descriptions.

# Dispatch Console Operator and Supervisor – End User Training

Course	Target Audience	No. of Sessions	Duration (days)	Location	Date	Number of Attendees
MCC7500 Console Operator, Admin, and Alias Database Manager 2 Training Consoles	Dispatch Supervisors	1 (8 hour session)	1	cwics	After Installation and Prior to Cutover	8
MCC7500 Console Operator 10 Training Consoles	Dispatch Operator	16 (4 hour sessions)	8	CWICS	After Installation and Prior to Cutover	160 (10 per 4 hour session)

#### Supervisor Course Synopsis:

This course is designed to provide communications management personnel and dispatch supervisors with the knowledge to configure, activate, and customize the features of the MCC 7500 Dispatch Console. The classroom experience is a mix of instructor-led facilitation and hands-on activities.

#### Operator Course Synopsis:

This course will provide a dispatcher with the necessary skills to quickly access and activate the dispatch features of the MCC 7500 console. The classroom experience is a mix of instructor-led facilitation and hands-on activities.

# **COURSE OUTLINES**

# MCC7500 Dispatch Console Dispatcher's Training

#### **Target Audience**

Dispatch Console Operators and Dispatchers

#### Course Description

This course will provide a dispatcher with the necessary skills to quickly access and activate the dispatch features of the MCC 7500 console. The classroom experience is a mix of instructor-led facilitation and hands-on activities.

#### Required Pre-Work

None

#### Recommended Prerequisites

- Proficiency in IBM-compatible computers
- Proficiency in the Microsoft<sup>®</sup> Windows<sup>™</sup> operating system interface

#### Course Objectives

- Access and activate radio features basic to two-way communications
- Transmit and receive a variety of voice communications using all of the console's features
- · Control repeater access
- Work with multiple selections of radio channels
- Optimize telephone and intercom calls
- · Communicate with callers on a separate telephone system

- Control sets of radio channels or telephone lines as patches
- · Send a page in two different ways, and program the page list
- Send or receive a stat-alert signaling message or request

#### Course Outline

- A. Module 1: Overview
  - 1) Start the Program
  - 2) Log In
  - 3) Log Out
  - 4) Exit the Program
- B. Module 2: Basic Radio Operations
  - a. Select a Radio
  - b. Unselect a Selected Radio
  - c. Select a Radio Channel
  - d. Unit ID or Alias
  - e. Receive a Radio Channel
  - f. Adjust Volume
  - g. Mute/Unmute Radio Channel Audio
  - h. Mute/Unmute All Unselected Channel Audio
  - i. Activity Log Window
  - j. Respond to Emergency Call
  - k. Send an Alert Over Selected Radio Channels
  - I. Transmit on a Radio Channel
  - m. Transmit on a Multiple Selection
  - n. Transmit an APB
  - o. Transmit to the Base Station Intercom
  - p. Transmit Queue
  - 1) Private-Line/Tone-Coded Squelch Control
    - a. Enable/Disable the Coded Squelch
    - b. Change the Coded Squelch
  - Voice Secure
- C. Module 3: Multiple Selection of Radio Channels
  - 1) Create a Multiple Selection
  - 2) Delete a Multiple Selection
  - 3) Activate a Multiple Selection
  - 4) Deactivate a Multiple Selection

#### D. Module 5: Call Director

- 1) Basic Operation
- 2) Exit a Call Director Call

#### E. Module 6: Patching

- 1) Create a Patch
- 2) Modify a Patch
  - a. Add a Radio Channel Control
  - b. Remove a Radio Channel Control
- 3) Clear a Patch
- 4) Activate a Patch
- 5) Transmit on a Patch
- F. Module 7: Paging
  - 1) Send a Page
- G. Module 9: Supervisory Features
  - 1) Takeover
  - 2) Supervisory Button

# MCC 7500 Dispatch Console Administrator & Supervisory Training

#### **Target Audience**

Dispatch Supervisors

#### Course Description

This course is designed to provide communications management personnel and dispatch supervisors with the knowledge to configure, activate, and customize the features of the MCC 7500 Dispatch Console. The classroom experience is a mix of instructor-led facilitation and hands-on activities.

#### Required Pre-Work

None

#### Recommended Prerequisites

- Proficiency in IBM-compatible computers
- Proficiency in the Microsoft® Windows™ operating system interface

#### **Course Objectives**

- Load and save a configuration into the console
- Customize the dispatch screen layout
- Customize a dispatch console's settings
- Customize a dispatch system's settings
- Assign shortcuts to software-activated functions
- Configure the console's radio channels
- Customize the paging list
- Access and activate all supervisory features

#### **Course Outline**

#### A. Module 1: Access the Software

- 1) Start the Program
- 2) Log In
- 3) Load a Configuration
- 4) Save a Configuration
- 5) Save a Configuration As
- 6) Log Out
- 7) Exit the Program

#### B. Module 2: Manage the Interface

- 1) Customize the Screen Layout
  - a. Move a Window
  - b. Resize a Window
  - c. Add a New Tab Window
  - d. Add a Button or Control
  - e. Activate a Button or Control
  - f. Move a Button or Control
  - g. Delete a Button or Control
- 2) Customize a Dispatcher's Console
  - a. General Settings
  - b. Allow Layout Reconfiguration
  - c. Zoom
  - d. Colors
  - e. Activity Log Setting
  - f. Console Access

#### C. Module 3: Manage the Network

- 1) Customize the System Settings
  - a. Date and Time
  - b. Volume
  - c. Tests
  - d. T1 Links
  - e. Miscellaneous
- 2) Assign Shortcuts
  - a. Add a Shortcut
  - b. Remove a Shortcut
- 3) Configure the Radio Channels
  - a. Enable Channel Commands

- b. Assign Frequency Aliases
- c. Configure the Radio Channel Indicators
- d. Edit the Radio Channel Indicators
- e. Enable Radio Channel Access at Designated Consoles
- f. Disable Radio Channel Access at Designated Consoles
- 4) Additional Supervisory Features
  - a. Activate Non-Visible Resources
  - b. Takeover
  - c. Activate the Supervisory Button



# **CWICS EXPANSION**

# System Description AND ACCEPTANCE TESTING

JANUARY 2006

# SYSTEM DESCRIPTION

This document serves as a description of the system design and equipment provided by Motorola for the CWICS Expansion of the Austin/Travis County Regional Radio System.

The following equipment will be provided as part of the CWICS Expansion. A detailed discussion of each follows this summary.

- RRS Infrastructure Upgrade
- RRS Infrastructure Expansion
- CWICS 4 Site, 15 Channel Simulcast Radio System
- System Management and Alarm System
- Microwave System Expansion to connect CWICS System to the RRS System
- CWICS Dispatch Centers

#### RRS INFRASTRUCTURE UPGRADE

The Austin/Travis County Regional Radio System (RRS) upgrade will include upgrading the existing RRS infrastructure. This upgrade will allow for CWICS simulcast subsystem to tie into the RRS Master Site. This upgrade will include any required software and/or hardware to upgrade the CTECC master site, radio sites, dispatch consoles, system management sub-systems and affected spares.

It is anticipated that the ATIA interface will be changing, and the City of Austin will have to make the appropriate changes to their logging interface.

#### RRS INFRASTRUCTURE EXPANSION

The Regional Radio System (RRS) will be expanded to accommodate the CWICS Radio System, Dispatch and System Management add-on. This RRS expansion will involve the following:

- Additional 3 Site license to the RRS Master Site. The CWICS simulcast system
  will be considered one site and that leaves 2 additional sites that CWICS could
  add-on to the system (such as a backup repeater site, Cedar Park repeater site,
  etc.)
- Additional 3,000 Radio User license to the Zone Database Server for CWICS subscribers.
- Additional concurrent session to the Zone Database Server for a System
  Management Client to access various applications. Application sessions to
  include Basic Radio Control Manager and User Control Manager. Additional
  sessions for Zone Historical Reports, Dynamic Historical Reports and Affiliation
  User Reports are not included.

#### CWICS SIMULCAST RADIO SYSTEM

The CWICS Simulcast Sub-System will include a 4 site, 15 channel, 800 MHz, Project 25 simulcast system to be located in Williamson County. This radio sub-system will be installed at the existing radio sites at Cedar Park, Liberty Hill, Twin Tower Prime Site and Thrall. The Simulcast System will tie into the CTECC Master Site via a microwave system. The following equipment is provided as part of this sub-system.

- (1) Prime Site Equipment to be installed at the Twin Tower Site Redundant Prime Site Controllers, AstroTAC voting comparators, Redundant Prime Site Routers and Trak frequency reference.
- (4) Simulcast Radio Site Equipment to be installed at the Cedar Park, Liberty Hill, Twin Tower Site and Thrall. Components include:
  - o (15) GTR P25 100 Watt Simulcast Base Radio Stations
  - o (2) 10 Channel Transmit Antenna Networks
  - o (1) 24 Channel Receive Antenna Network
  - o LAN equipment (Remote Site Router and Switch)
  - o Channel Banks as required for connectivity
  - OC Power System to provide uninterrupted power in the event of commercial power failure. Batteries will provide 30 minutes of power at each of the 3 remote radio sites and 2 hours of power at the Prime Site in the event the site generators do not come on.
  - Spares S2500 Dispatch Site Router, HP2626 Dispatch and Radio Site Switch, Prime Site Controller modules and a full GTR Base Station. Existing Austin Spares for the AstroTAC comparator, ST6000 Prime Router, Trak, Channel Banks, DC Power System and Moscad RTU will be used to maintain the CWICS system.

#### SYSTEM MANAGEMENT AND ALARM SYSTEM

The proposed system management sub-system will include the following:

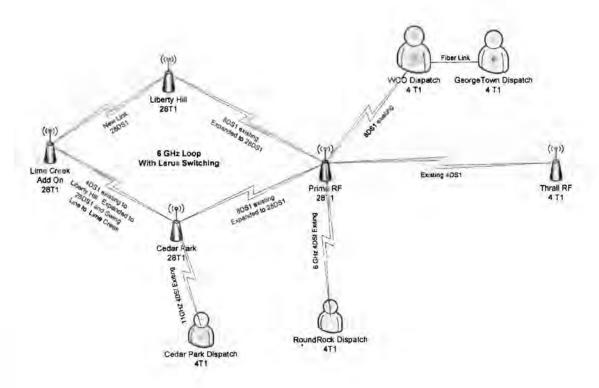
- Replacement of Remote Terminal Units (RTUs) at each of the 4 radio sites to monitor existing site alarms, TeSNr channel banks, Tadiran Microwave equipment and Trak devices. The new RTU will have the capability of 48 digital dry-contact Input/Outputs. Moscad alarms are displayed on a dedicated Moscad Computer (GMC) as well as forwarded to the System SNMP alarm manager. Base Stations, Routers, Controllers, Switches and other core infrastructure equipment will be monitored directly via IP-Based SNMP alarms through the Zone database System Management system.
- Replacement of the Graphic Master Central (GMC) at the Williamson County dispatch with a new GMC Client computer. This client displays the Moscad alarms.
- One System Network Management Client to be located at one of the four CWICS dispatch locations. This management client will provide CWICS with the ability to inhibit radios, regroup users, etc.
- For the warranty period Motorola will be providing 7x24 hour monitoring of system alarms.

#### MICROWAVE SYSTEM EXPANSION

Motorola is proposing to expand and connect the existing CWICS and RRS microwave systems. This microwave expansion will include upgrading the CWICS Williamson County 6 GHz Loop system to add an RRS site (Lime Creek) to their Loop System and expanding it from 8 T1 capacity to 28 T1 capacity. This T1 expansion on the CWICS loop will allow for the existing analog system and the new digital radio system to be installed in parallel for an easy cutover plan.

This microwave expansion does not provide capacity changes to the Dispatch Site Spurs. Motorola is not anticipating needing more TI capacity at the Dispatch Sites, although this depends on the cutover plan, final dispatch configuration, conventional interfaces, logging and future operator capacity, which has not been fully defined at this date.

Although the RRS microwave system will need to be reprogrammed for the appropriate T1 drop and inserts, the capacity of the existing infrastructure is adequate to support the extra CWICS T1's without any hardware expansion.



#### CWICS DISPATCH CENTERS

The expansion will include a replacement of the existing Gold Elite console system with the MCC7500 IP-Based console system. The following will be included:

#### Cedar Park Dispatch

- (2) MCC7500 Operator Position where each includes CPU, 21" Flat Screen Non-Touch Monitor, Select and Un-Select Desktop Speakers, Footswitch, (2) Headset Jacks, Gooseneck Microphone and a mouse.
- (2) Instant Recall Recording software for short term recording.
- (2) Conventional Channel Gateway Router (CCGW) that includes the interface for 8 conventional stations and/or trunking control stations.
- (1) Auxiliary Input Server to include 6 outputs and 12 inputs.
- Router and LAN switch.
- (1) Archive Interface Server for Standard Capacity logging, (1) NICE Digital Logging Recorder with 30 call capability and (1) play-back station to replace existing Gold Elite de-trunking interface (LOMI/LORI cards).

#### Georgetown Dispatch

- (3) MCC7500 Operator Position where each includes CPU, 21" Flat Screen Non-Touch Monitor, Select and Un-Select Desktop Speakers, Footswitch, (2) Headset Jacks, Gooseneck Microphone and a mouse.
- (3) Instant Recall Recording software for short term recording.
- (2) Conventional Channel Gateway Router (CCGW) that includes the interface for 8 conventional stations and/or trunking control stations.
- (1) Auxiliary Input Server to include 6 outputs and 12 inputs.
- Router and LAN switch.
- Local logging will be accomplished via receive-only control stations wired directly to
  existing analog logging recorder. Replacement digital control stations and associated
  antenna networks are not included in this proposal.

#### Round Rock Dispatch

- (4) MCC7500 Operator Position where each includes CPU, 21" Flat Screen Non-Touch Monitor, Select and Un-Select Desktop Speakers, Footswitch, (2) Headset Jacks, Gooseneck Microphone and a mouse.
- (4) Instant Recall Recording software for short term recording.
- (2) Conventional Channel Gateway Router (CCGW) that includes the interface for 8 conventional stations and/or trunking control stations.
- (1) Auxiliary Input Server to include 6 outputs and 12 inputs.
- Router and LAN switch.
- Local logging will be accomplished via receive-only control stations wired directly to
  existing analog logging recorder. Replacement digital control stations and associated
  antenna networks are not included in this proposal.

#### Williamson County Dispatch

- (6) MCC7500 Operator Position where each includes CPU, 21" Flat Screen Non-Touch Monitor, Select and Un-Select Desktop Speakers, Footswitch, (2) Headset Jacks, Gooseneck Microphone and a mouse.
- (6) Instant Recall Recording software for short term recording.
- (2) Conventional Channel Gateway Router (CCGW) that includes the interface for 8 conventional stations and/or trunking control stations.
- (1) Auxiliary Input Server to include 6 outputs and 12 inputs.
- Router and LAN switch.
- Local logging will be accomplished via receive-only control stations wired directly to
  existing analog logging recorder. Replacement digital control stations and associated
  antenna networks are not included in this proposal.

# **CWICS FUNCTIONAL ACCEPTANCE TEST PLAN**

The CWICS functional Acceptance Test Plans (ATP) are executed at the completion of the installation of the CWICS Simulcast Subsystem. These Acceptance Test Plans specify the standards and tests to which Motorola will adhere. It is anticipated that an authorized representative of CWICS will be present during the testing period to witness each of the acceptance action items.

The failure of one test will not necessarily require that the entire ATP be run again. In the event of a test failure, Motorola will determine the cause of the failure, make the required corrections, and that particular test will be run again.

#### ACCEPTANCE TESTS REFERENCE SHEETS

System Functional Tests	
Automatic Retry	
Talkgroup Call	
Private Call	
Call Alert	
Busy Queuing and Callback	
Emergency Call and Alarm	
Continuous Assignment Updating	
Failure of Prime Site Redundant Equip	ment
Failure of Radio Site Channel Equipme	ent
Radio Site Backup Power	
Console Functional Tests	4.0
Talkgroup Selection and Call	
Busy Indication	
PTT Unit ID/Alias Display	
Emergency Alarm and Call Display	
Call Alert	
Multi-Select /All Points Bulletin (APB)	
Trunking Patch	
2-Tone and DTMF Paging	

# COVERAGE ACCEPTANCE TEST PLAN

#### **OVERVIEW**

This Coverage Acceptance Test Plan (CATP) is designed to verify that the 800 MHz Project 25 Trunked Radio System for CWICS Simulcast Subsystem implemented by Motorola meets or exceeds the required coverage reliability within the Customer's Coverage Test Area as defined in this document. The CATP defines the coverage testing method and procedure, the coverage acceptance criteria, the test documentation, and the responsibilities of both Motorola and the Customer.

In general, this test is a voice quality test for portable radios operating outside.

#### **EQUIPMENT CONFIGURATIONS**

The coverage acceptance is based on a 3 Watt XTS Portable at hip level. The portable with a half-wave flex whip antenna will be located in a swivel case at hip level with a speaker microphone. The portable will operate outdoors in the digital mode (IMBE vocoder) for inbound and outbound.

#### CRITERIA FOR PASSING INDIVIDUAL TEST POINT

The criteria for a successful pass of an individual test point for this system is that both In-bound and Out-bound transmissions meet or exceed a Delivered Audio Quality (DAQ) of 3.4. DAQ 3.4 is defined as "Speech Understandable with Some Noise and/or Distortion" and is determined subjectively by a team of people.

#### COVERAGE TEST AREA

The customer service area will be considered anywhere within the Williamson County boundaries. The predicted coverage area is the area that Motorola predicted for the required reliability and audio quality with the specific equipment configurations and site parameters. The coverage test area is any area that falls within both predicted coverage area and Williamson County service area. Predicted Coverage Map will be provided.

#### RELIABILITY

The reliability is the percent of locations within the coverage test area which meet or exceed DAQ 3.4. The required reliability for the System is 95% area reliability for the Coverage Test Area.

#### CATP METHOD

The method used to test coverage is statistical sampling of the Coverage Test Area to verify that DAQ 3.4 voice quality is met or exceeded at the required reliability. It is impossible to verify every point within a coverage area, because there are infinite points; therefore, coverage reliability will be verified by sampling a statistically significant number of randomly selected locations, uniformly distributed throughout the predicted coverage area.

#### Determine the Required Number of Grids in the Coverage Area

The Customer's Service Area will be divided into a maximum of 1 mile by 1 mile grid pattern. Prior to testing (if possible) or during the test, Motorola and the Customer will determine if any grids are not accessible for the coverage test (due to lack of roads, restricted land, etc.) Inaccessible grids will be eliminated from the total. If a large number of grids are deemed inaccessible, it may then be necessary to regrid the test area in order to maintain a statistically significant number of grids of 500 or more.

#### Test Teams

Two or three test teams will consist of a minimum of three individuals per team and will have the groups as follows:

One Base Team located at a Console Operator Position or a subscriber located in a known good coverage area

- Dispatcher for Voice Transmissions: Customer
- Record Keeper: Motorola
- Additional Audio Quality Participant: Motorola

One or Two Field Team located in the field

- Driver and Portable Voice Tester: Customer
- Record Keeper: Customer
- Additional Audio Quality Participant and Test Equipment Operator: Motorola

#### Randomly Select a Test Location within Each Grid

Motorola's Voyager test equipment will be used in the test vehicle to determine where the grids are and guide the field team to each test point using GPS. The actual test location within each grid will be randomly determined by the test equipment as the car crosses into the grid at an arbitrary point.

### Perform Measurements in Each Grid

Before performing the subjective DAQ testing, all personnel who will evaluate audio quality must be "calibrated" by listening to examples of static and faded audio of various DAQ levels.

Each test team will have their own talkgroup on the trunk system to ensure they are hearing audio for their particular grid,

In each grid, the test team will listen to an audio transmission, and each person will record their subjective evaluation of the Delivered Audio Quality (DAQ 3.4) for this grid. For each grid, the DAQ evaluations of all test team personnel will be majority voted to determine whether the grid passes or fails.

Each test team will keep a log of the following information for each test point:

- Date
- Test Team Names
- Time
- Test Result (Pass/Fail)
- Location (Voyager grid number and location description)
- Comments

## Determine if Each Grid Passes or Fails

In order to expedite the test, the grid will be first tested with the portable in a vehicle while moving at a moderate speed. Since a portable in a vehicle provides more loss than a portable outdoors, this is a worst case scenario. If the in vehicle test should fail, than the test team will stop the vehicle and conduct the test outdoors. This outdoor test will be considered the initial test for the grid. If the grid should fail the initial outdoor portable in a swivel case audio quality test, one audio quality retry will be allowed. The tester will be allowed to move up to 10' in any direction from the original test point. If the second audio quality attempt passes, the grid will be considered a pass.

Motorola will conduct the acceptance testing only once. If any portion of the test is determined to be unreliable because of proven equipment malfunctions or failures, Motorola will repeat the portion of the test affected by the equipment malfunction or failure. The Customer will have the option to accept the coverage at any time prior to completion of the coverage test.

Motorola is not responsible for interference caused or received by the Motorola provided equipment except for interference that is directly caused by the Motorola provided transmitter(s) to the Motorola provided receiver(s). If the coverage test should fail, and it was deemed to be caused by interference, the test grids associated with the interference will be considered passed. Should the RRS experience interference, Motorola can be contracted to investigate the source and recommend solutions to mitigate the issue.

#### CATP DOCUMENTATION AND COVERAGE ACCEPTANCE

After all accessible grids in the coverage area have been tested, the data will be compiled to determine if the overall test was successful. Since it was determined to test all grids within the Customer Service Area that might or might not be covered within the Predicted Coverage Area, all failed grids will be overlaid with the Predicted Coverage Area. If a failed grid falls outside the Predicted Coverage Area, then that grid will be excluded from the overall results. After all remaining grids are determined to be valid test points, then the coverage area reliability percentage will be determined by dividing the number of valid grids which passed by the total number of valid grids tested. Overall calculated reliability must be 95% or greater to be deemed a successful Coverage Test.

A final report of test results will include the following:

- Executive Overview
- Summary of Results
- Map with Results
- Discussion Summary of Test Processes

Copies of the report will be provided in paper and electronic format.

Motorola will submit to the Customer a report detailing the coverage test results. If an equipment configuration fails coverage acceptance testing, a recommendation for resolving the issue will be provided. This report will include a form which will be signed by both the Customer and Motorola, indicating the test was performed in accordance with this CATP and the results of the test indicate the acceptance or non-acceptance of the coverage portion of the system. The Customer will have the option to accept the coverage at any time prior to completion of the coverage test or documentation process.

#### RESPONSIBILITIES AND PREPARATION

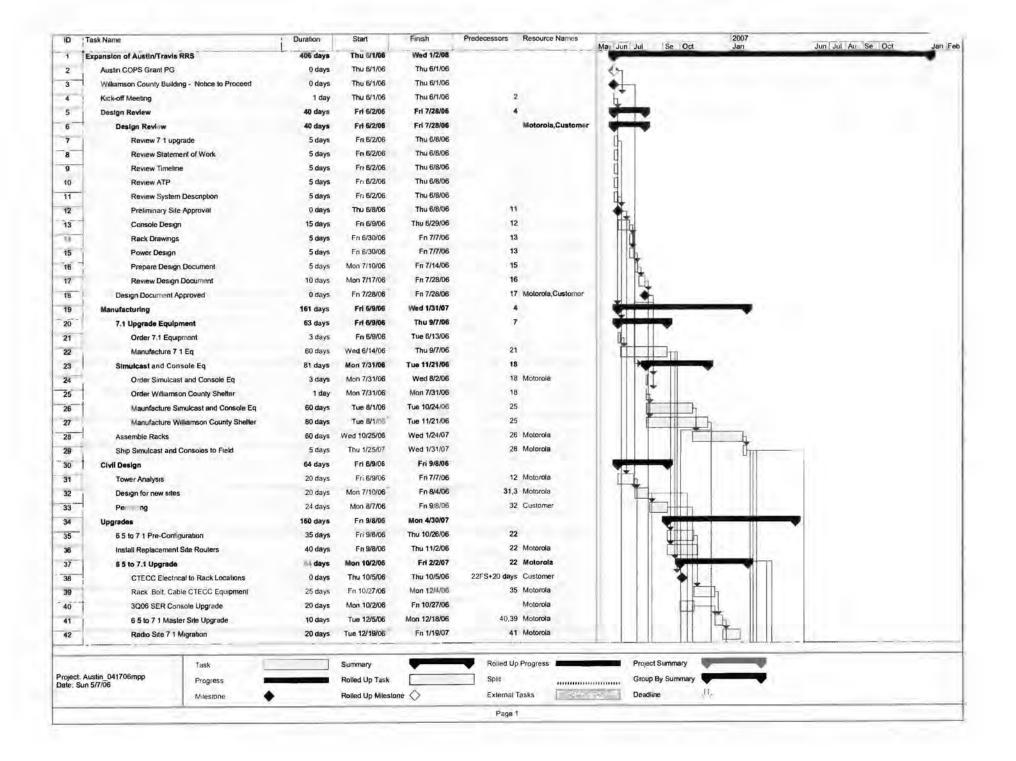
This information will help set the expectations of the Customer and Motorola regarding requirements for equipment, personnel, and time during the coverage test.

The Customer will provide the following for the duration of the coverage test:

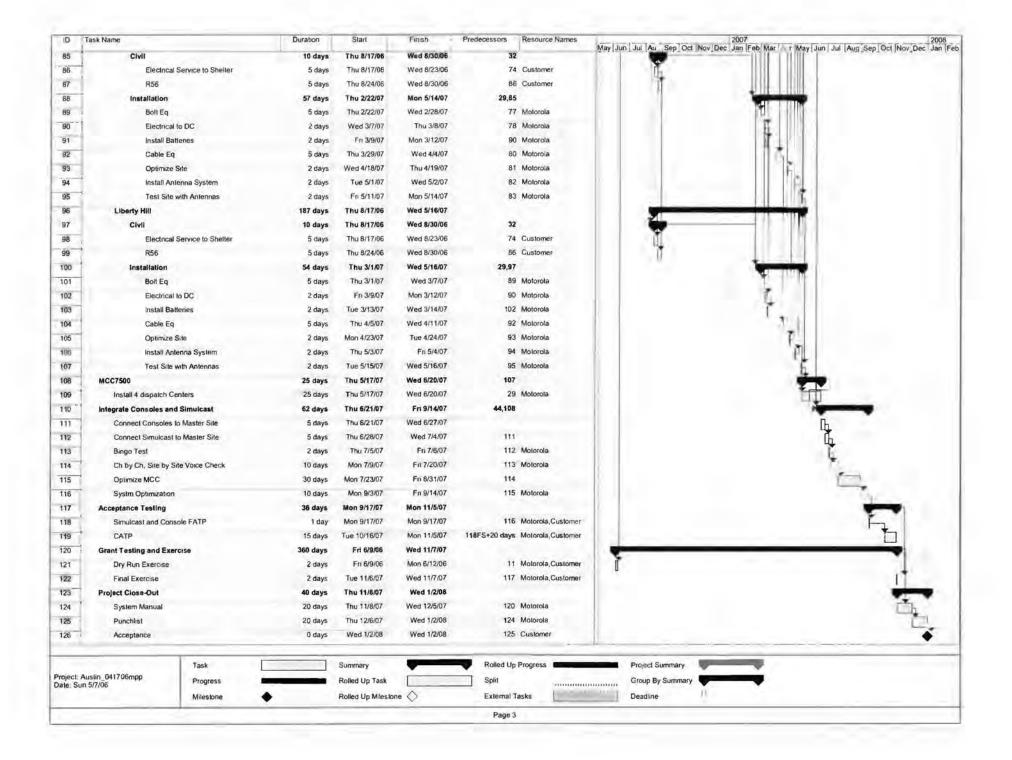
- · Test vehicle(s).
- Customer personnel and vehicles for testing shall be available 8 AM to 5 PM on weekdays, excluding holidays. Other time periods may be agreed upon between Motorola and the Customer.

Motorola will provide the following for the duration of the coverage test:

- Motorola representative, to navigate and to operate Voyager.
- Motorola Voyager coverage testing package.
- Additional personnel for the test team at the control point.
- · Test log forms.



	Task Name	7400045	Duration	Start	Finish	Predecessors Resource Names  41 Motorola	May Jun Jul Aug Sep Oct Nov Dec	Feb Mar Apr May Jun Jul Aug Sep Oct Nov De
43	Install Replaceme	ent MOSCAD	30 days	Tue 12/19/06	Fn 2/2/07			
44	7.1 to 7.2 Upgrade	25.1	30 days	Mon 3/19/07	Mon 4/30/07	37		* * * * * * * * * * * * * * * * * * *
45	7 1 to 7 2 Master		10 days	Mon 3/19/07	Fn 3/30/07	37FS+30 days Motorola		*
46		e Sites and Consoles	20 days	Mon 4/2/07	Mon 4/30/07	45 Motorola		
47	Microwave		45 days	Man 7/10/06	Mon 9/11/06	40 41 11 11		
48	Physical Path Surveys		5 days	Mon 7/10/06	Fn 7/14/06	31 Motorola	14	
49	Frequency Coordinate	on and License	20 days	Mon 7/17/06	Fn 8/11/06	48 Motorola		
50	FCC License		20 days	Mon 7/17/06	Fn 8/11/06	48 Customer	life.	
51	Expand Existing Sites		10 days	Mon 8/14/06	Fn 8/25/06	50 Motorola	104	311
52	Install New Hops		10 days	Mon 8/28/06	Mon 9/11/06	51 Motorola		1
53	Radio Site FCC License		0 days	Wed 1/31/07	Wed 1/31/07	29 Customer		•
54	Simulcast Site Implemen	tation	195 days	Mon 8/7/06	Wed 5/16/07	17		7
55	Lime Creek		3 days	Mon 8/7/06	Wed 8/9/06			
56	Installation		3 days	Mon 8/7/06	Wed 8/9/06	32		
57	Electrical for	UW DC	3 days	Mon 8/7/06	Wed 8/9/06	32 Motorola		
58	CWICS Prime Site		133 days	Wed 10/25/06	Tue 5/8/07		A COLOR	
59	Civil		33 days	Wed 10/25/06	Tue 12/12/06	32,27FS-20 days	-	
60	Conduit Bet	ween New/Old Shelter	3 days	Wed 10/25/06	Fri 10/27/06	33 Motorola	1	
61	Foundation		10 days	Mon 10/30/06	Fri 11/10/06	60 Motorola	Th-	
62	Deliver and	Set Shelter	10 days	Wed 11/22/06	Thu 12/7/06	61,27 Motorola	-	
63	Electrical Se	ervice to Shelter	3 days	Fn 12/8/06	Tue 12/12/06	62 Customer	T.	
64	Installation		68 days	Thu 2/1/07	Tue 5/8/07	29,59		-
65	Bolt Eq		10 days	Thu 2/1/07	Wed 2/14/07	Motorola		
66	Electrical to	DC	2 days	Thu 3/1/07	Fn 3/2/07	89 Motorola		(1)
67	Install Batter	nes	2 days	Mon 3/5/07	Tue 3/6/07	66 Motorola		Ť
68	Cable Eq		10 days	Thu 3/8/07	Wed 3/21/07	101 Motorola		
69	Optimize Sit	e	2 days	Thu 4/12/07	Fn 4/13/07	104 Motorola		17 6
70	Install Anten		2 days	Wed 4/25/07	Thu 4/26/07	105 Motorola		The l
71	Test Site wit		2 days	Mon 5/7/07	Tue 5/8/07	106 Motorola		11 134
72	Cedar Park		188 days	Thu 8/10/06	Thu 5/10/07			
73	Civil		10 days	Thu 8/10/06	Wed 8/23/06	32		
74		ervice to Shelter	5 days	Thu 8/10/06	Wed 8/16/06	56 Customer	1.	1011 1111
75	R56		5 days	Thu 8/17/06	Wed 8/23/06	74 Customer	17	. 11.11.1.13.11
76	Instaltation		60 days	Thu 2/15/07	Thu 5/10/07	29,73		<b>********</b>
77	Bolt Eq		5 days	Thu 2/15/07	Wed 2/21/07	65 Motorola		
78	Electrical to	DC	2 days	Mon 3/5/07	Tue 3/6/07	66 Motorola		mat IIII
79	Install Batter		2 days	Wed 3/7/07	Thu 3/8/07	78 Motorola		11711111
80	Cable Eq		5 days	Thu 3/22/07	Wed 3/28/07	68 Motorola		111151111
81	Optimize Sit	e	2 days	Mon 4/16/07	Tue 4/17/07	69 Motorola		
82	Install Anten		2 days	Fn 4/27/07	Mon 4/30/07	70 Motorola	11. 1	
83	Test Site wil		2 days	Wed 5/9/07	Thu 5/10/07	71 Motorola		
84	Thrall	an ex (227 117 )	185 days	Thu 8/17/06	Mon 5/14/07			
1		# NA					- U - L	
		Task		Summary	_	Rolled Up Progress	Project Summary	-
Project: A	Austin_041706mpp	Progress		Rolled Up Task		Solit	Group By Sugrepany	
Date: Sur	5/7/06					External Tasks	Deadline .[1	
		Milestone		Rolled Up Mileston	ie V		Deaume	
						Page 2		



Subsystem	Description & Quantity	Solution
Regional Radio System Upgrade	Refresh Software Update IP Routers Update Master Site Servers	\$600,000
Microwave System Expansion	Add Hop to Lime Creek to Loop Upgrade from 8T1 to 28T1 Capacity on Loop	\$630,419
Prime Simulcast Site	Redundant Prime Site Controllers AstroTAC voting comparators Redundant Prime Site Routers Trak frequency reference 2 hour DC Backup Power	\$828,557
Remote Simulcast Sites - Westinghouse Road - Cedar Park - Liberty Hill - Thrall	Each Remote Site Includes: Fifteen (15) GTR P25 100 Watt Simulcast Base Radio Stations Two (2) 10 Channel Transmit Antenna Networks One (1) 24 Channel Receive Antenna Network LAN equipment (Remote Site Router and Switch) Channel Banks as required for connectivity 30 min of DC Backup Power System Spares – S2500 Dispatch Router, HP2626 Dispatch and Radio Site Switch, Prime Site Controller modules and GTR Base Station	\$2,849,641
IP Based Consoles	Williamson County Six (6) Positions Round Rock Four (4) Positions Georgetown Three (3) Positions Cedar Park Two (2) Positions with Logging	\$287,053 \$219,297 \$184,862 \$224,226
Network Management	One (1) Network Management Client and Server Licenses	\$58,578
Professional Services	Detailed Design Review Project Management Field Engineering Plant Engineering System Technologist Integration & Optimization Acceptance Testing Documentation	\$2,107,368

# Cops Interoperability Grant Total

# \$7,990,000

			Approximat	te	
Milestone	Payment	Percent of Project	Date	\$/per Qtr	
Presentation of Statement of Work, Project Plan and Schedule	\$559,300	7.00%	Jun-06	\$559,300	Q2-06
Completion of Timeline and User Consultation	\$399,500	5.00%	Jul-06		
Completion of Detail Design Document	\$799,000	10.00%	Aug-06		
Complete Civil Design Stage	\$319,600	4.00%	Sep-06	\$1,518,100	Q3-06
Installation of MicroWave	\$319,600	4.00%	Nov-06	7 7	
Delivery of the Motorola Fixed Infrastructure Equipment to the Designated Staging Area in the Field	\$1,198,500	15.00%	Dec-06	\$1,518,100	Q4-06
Completion of 6.5 to 7.1 Upgrade	\$1,198,500	15.00%	Mar-06	\$1,198,500	Q1-07
Installation of the Fixed Infrastructure Equipment (FIE)	\$958,800	12 00%	May-06	\$958,800	Q2-07
Successful Completion of FIE functional ATP	\$399,500	5.00%	Sep-06	\$399,500	Q3-07
Sucessful completion of the Field Coverage Acceptance Plan	\$399,500	5.00%	Nov-06		
Successful Completion of the Grant Testing and Exercise the System	\$799,000	10.00%	Nov-06	\$1,198,500	Q4-07
Final Acceptance / Retainage	\$639,200	8.00%	Jan-06	\$639,200	Q1-08
	\$7,990,000			\$7,990,000	
	Presentation of Statement of Work, Project Plan and Schedule  Completion of Timeline and User Consultation  Completion of Detail Design Document  Complete Civil Design Stage  Installation of MicroWave  Delivery of the Motorola Fixed Infrastructure Equipment to the Designated Staging Area in the Field  Completion of 6.5 to 7.1 Upgrade  Installation of the Fixed Infrastructure Equipment (FIE)  Successful Completion of FIE functional ATP  Successful completion of the Field Coverage Acceptance Plan  Successful Completion of the Grant Testing and Exercise the System	Presentation of Statement of Work, Project Plan and Schedule \$559,300  Completion of Timeline and User Consultation \$399,500  Completion of Detail Design Document \$799,000  Complete Civil Design Stage \$319,600  Installation of MicroWave \$319,600  Delivery of the Motorola Fixed Infrastructure Equipment to the Designated Staging Area in the Field  Completion of 6.5 to 7.1 Upgrade \$1,198,500  Installation of the Fixed Infrastructure Equipment (FIE) \$958,800  Successful Completion of FIE functional ATP \$399,500  Successful completion of the Field Coverage Acceptance Plan \$399,500  Successful Completion of the Grant Testing and Exercise \$799,000  the System  Final Acceptance / Retainage \$639,200	Presentation of Statement of Work, Project Plan and Schedule \$559,300 7.00%  Completion of Timeline and User Consultation \$399.500 5.00%  Completion of Detail Design Document \$799,000 10.00%  Complete Civil Design Stage \$319,600 4.00%  Installation of MicroWave \$319,600 4.00%  Delivery of the Motorola Fixed Infrastructure Equipment to the Designated Staging Area in the Field  Completion of 6.5 to 7.1 Upgrade \$1,198,500 15.00%  Installation of the Fixed Infrastructure Equipment (FIE) \$958,800 12.00%  Successful Completion of FIE functional ATP \$399,500 5.00%  Successful completion of the Field Coverage Acceptance Plan \$399,500 5.00%  Successful Completion of the Grant Testing and Exercise the System  Final Acceptance / Retainage \$639,200 8.00%	Milestone Payment Project Date Presentation of Statement of Work, Project Plan and Schedule \$559,300 7.00% Jun-06 Completion of Timeline and User Consultation \$399,500 5.00% Jul-06 Completion of Detail Design Document \$799,000 10.00% Aug-06 Complete Civil Design Stage \$319,600 4.00% Sep-06 Installation of MicroWave \$319,600 4.00% Nov-06 Delivery of the Motorola Fixed Infrastructure Equipment to the Designated Staging Area in the Field Completion of 6.5 to 7.1 Upgrade \$1,198,500 15.00% Mar-06 Installation of the Fixed Infrastructure Equipment (FIE) \$958,800 12.00% May-06 Successful Completion of FIE functional ATP \$399,500 5.00% Sep-06 Successful completion of the Field Coverage Acceptance Plan \$399,500 5.00% Noy-06 the System \$799,000 10.00% Noy-06 Final Acceptance / Retainage	Milestone         Payment         Project         Date         \$/per Qtr           Presentation of Statement of Work, Project Plan and Schedule         \$559,300         7.00%         Jun-06         \$559,300           Completion of Timeline and User Consultation         \$399,500         5.00%         Jul-06         Completion of Detail Design Document         \$799,000         10.00%         Aug-06         Aug-06           Complete Civil Design Stage         \$319,600         4.00%         Sep-06         \$1,518,100           Installation of MicroWave         \$319,600         4.00%         Nov-06         Nov-06           Delivery of the Motorola Fixed Infrastructure Equipment to the Designated Staging Area in the Field         \$1,198,500         15.00%         Mar-06         \$1,518,100           Completion of 6.5 to 7.1 Upgrade         \$1,198,500         15.00%         Mar-06         \$1,198,500           Installation of the Fixed Infrastructure Equipment (FIE)         \$958,800         12.00%         May-06         \$958,800           Successful Completion of FIE functional ATP         \$399,500         5.00%         Nov-06         \$399,500           Successful Completion of the Field Coverage Acceptance Plan         \$399,500         5.00%         Nov-06         \$1,198,500           Successful Completion of the Grant Testing and Exercise         <

# Cops Interoperability Grant Total

# \$7,990,000

			H010110102	Approximate
	Milestone	Payment	Percent of Project	Date
1.	Presentation of Statement of Work, Project Plan and Schedule	\$559,300	7.00%	Jun-06
2.	Completion of Timeline and User Consultation	\$399,500	5.00%	Jul-06
2a.	Completion of Detail Design Document	\$799,000	10.00%	Aug-06
3.	Complete Site and Tower Engineering	\$319,600	4.00%	Sep-06
4	Installation of MicroWave	\$319,600	4.00%	Nov-06
5.	Delivery of the Motorola Fixed Infrastructure Equipment to the Designated Staging Area in the Field	\$1,198,500	15.00%	Dec-06
5a.	Completion of 6.5 to 7.1 Upgrade	\$1,198,500	15.00%	Mar-07
6.	Installation of the Fixed Infrastructure Equipment (FIE), excluding Consoles	\$958,800	12.00%	May-07
7.	Successful Completion of FIE functional ATP	\$399,500	5.00%	Sep-07
8.	Sucessful completion of the Field Coverage Acceptance Plan	\$399,500	5.00%	Nov-07
9.	Successful Completion of the Grant Testing and Exercise the System	\$799,000	10.00%	Nov-07
10.	Final Acceptance / Retainage	\$639,200	8.00%	Jan-08
		\$7,990,000		



# AMENDMENT NO. 4 TO THE COMMUNICATIONS SYSTEM AGREEMENT FOR THE 911 RDMT RADIO PROJECT

## BETWEEN THE CITY OF AUSTIN, TEXAS AND MOTOROLA INC.

This Amendment No. 4 ("Amendment") to the Communications System Agreement dated December 27, 2000 ("Agreement") is made and entered to between the parties thereto, Motorola Inc. a Delaware Corporation ("Motorola"), by and through the North America Group of its Government Enterprise Mobility Solutions business ("GEMS") and the City of Austin ("City"), a Texas home-rule municipal corporation acting for itself and on behalf of other governmental entities that have executed the 800 MHz Trunked Voice Radio System Implementation Interlocal Agreement ("Interlocal Agreement"), collectively referred to herein as the "Customer"

WHEREAS, both parties entered into an Agreement dated December 27, 2000 for the purchase and installation of an 800 MHz Trunked Radio Communications System, or Regional Radio System or 9-1-1 RDMT Radio Project ("Communications System"); and

WHEREAS, both parties executed Amendment No. 1 dated January 4, 2001 to extend rights to Eligible Users, including Travis County who have issued Purchase Orders for equipment to be used with the Communications System; and

WHEREAS, both parties executed Amendment No. 2 dated October 11, 2001 to amend the Scope of the Agreement by giving the Customer a right to purchase additional radio communications products and services as specified in Exhibit E; and

WHEREAS, both parties executed Amendment No. 3 dated June 1, 2004 to allow the Customer to exercise the option to purchase additional units of Optional Subscriber equipment as specified in Exhibit E in an amount not to exceed \$11,000,000; and

WHEREAS, the Customer and Williamson County have been discussing upgrading the Williamson County's Trunked Radio System to have digital capability and to interface with the Customer's Communications System so that users of both Systems will have the capability of communicating easily and seamlessly with each other; and

WHEREAS, the Contractor has agreed to supply and install the necessary equipment and provide the appropriate services to so upgrade the Williamson County's Trunked Radio System and extend the Communications System's coverage to include users in Williamson County; and



NOW, THEREFORE, for and in consideration of the services to be performed hereunder, and the monetary consideration to be paid as provided herein, and other good and valuable considerations, the parties hereto agree to amend the above referenced Agreement as follows:

Improvement of coverage to users of the Mobile Data Communications System.
Contractor agrees to supply and install mobile data communications equipment as per
their Quotation No. brs020405q1 for \$55,017 on an existing radio tower site in Travis
County to improve mobile data radio coverage for Eligible Users.

## 2. Purchase Agreement

- A. Customer shall purchase and the Contractor agrees to supply, install and configure an upgrade to the software currently used by the City to operate the Communications System to the version 7x platform.
- B. Customer shall purchase and the Contractor agrees to supply and provide additional equipment and appropriate services designed to upgrade the Williamson County's Trunked Radio System:
  - with added digital capability,
  - to improve coverage in accordance with a Scope of Work with performance standards to be mutually agreed upon between the parties, and
  - 3) to build an interface between the Williamson County's Trunked Radio System and the Communications System so that users of both Systems can communicate easily and seamlessly with each other.
- C. Price Agreement. The additional equipment and appropriate services designed to upgrade the Williamson County's Trunked Radio System and to build an interface between the two Radio Systems will be delivered by the Contractor when the City issues a Price Agreement ("PG") document signed by the Manager of the Trunked Radio Project. The PG will be supported by the Contractor's quotation and a detailed Statement of Work, System Description, Acceptance Test Plan, Equipment List and mutually agreed upon payment milestones.
- D. Purchase Price. The purchase price for the additional equipment and services shall be in accordance with the Pricing Agreement, Exhibit E of the Agreement.

#### 3. Trunked Radio Project Manager

A. Michael (Mike) Simpson has taken over the responsibilities previously carried out by Robert Turner and invoices under section 5.2 shall henceforth be submitted to: Michael (Mike) Simpson, Wireless Communications Services Manager/Trunked Radio Project Manager, 1006 Smith Road, Austin Texas 78721. He will authorize invoices for payment based on the approved contract payment milestones that will accompany the detailed Statement of Work document and after being satisfied that the relevant payment milestone have been completed.



B. Brent Woolley has taken over the responsibilities previously carried out by Pam Faver and Notices under section 20.11 shall henceforth be submitted to: Brent Woolley, 7700 W. Parmer, PL-66, Austin, TX 78729.

#### 4. Increase in Contract Price

The Customer shall pay Motorola, and Motorola shall accept as full compensation and payment for the above enhancements to the Communications System and to CWICS a total not to exceed price of \$8,055,017; for a total revised contract price not to exceed EIGHTY SIX MILLION FOUR HUNDRED THREE THOUSAND THREE HUNDRED SEVENTY-SIX DOLLARS AND NO/100 (\$86,403,376).

#### 5. Entire Agreement.

This Amendment No. 4 is hereby made a part of the Communications System Agreement and all terms and conditions therein contained are applicable. The Communications System Agreement, all prior Amendments and Change Orders and this Amendment No. 4 shall be collectively referred to as the "Agreement".

#### 6. General.

The compensation and changes agreed upon in this Amendment are the complete equitable adjustments and final payment amount for all costs the Contractor may incur as a result of or relating to this Amendment. If there are any inconsistencies between the provisions of this Amendment No. 4 and the provisions of the Agreement, the provisions of this Amendment will prevail. Except as specifically stated in this Amendment, the Agreement and previous Amendment and Change Orders are in all other respects ratified, confirmed and continue in full force and effect

IN WITNESS WHEREOF, Motorola and the City have executed this Amendment No. 4 in duplicate originals and this amendment becomes effective on the date signed by the City ("Effective Date").

4

("Effective Date").	1/21/11/11
MOTOROLA INC. BY: Signature:	CITY OF AUSTIN BY: Signature:
Acres Labor	Urch m. Durin Crespo
PRINTED NAME: Steven J. Palm	PRINTED NAME: Urcha Dunbar-Crespo
TITLE: Senior Area Controller	TITLE: Acting Purchasing Officer
DATE: December 8, 2005	DATE: December 16, 2005
APPROVED AS TO FORM:	APPROVED AS TO FORM:
1. 162 0	Caull T. V.L
Signature: Adolf to dec	Signature: Signed by Tomma Kmtz Name: Tamara Kurtz on fax copy attached
Name: Scott Dodge	Name: Tamara Kurtz on tax copy attached
Title: Director, Contracts and Compliance	Title: Assistant City Attorney
Motorola Contracts and Compliance Dept	City of Austin Law Dept
Date: December 8, 2005	Date: 12/16/05



Date: Dec. 01, 2005

**Customer Connection Proposal** 

1307 E Algonquin Rd Schaumburg, IL 60196

Quote #:

brs020405q1

Account Manager: Brice Shelton

quote date 02/04/05

Prepared By: Pat Hoavey

Phone: (800) 367-2346

Fax: (800) 526-8639

CUSTOMER #:

1000559891

PREPARED FOR :	Mike Simpson	Вії То	Ship to	
COMPANY: (	City of Austin	Address: Please Advise	Address: Please Advise	
7/0/7/0/5/5/5	512927-3209			
FAX: (	512) 927-3222			

		Equipment Details and Pricing		Austin Contrac	t	
Qty.	Model	Description		Unit Price	3	Total Price
1	C99ED	QUANTAR/QUANTRO FAMILY		\$ 4,980.50	\$	4,980.50
1	001C	QUANTAR STATION				
1	X750	ADD: 800 MHZ BAND RX 806-825 MHZ/TX		\$ 4,419.80	\$	4,419.80
1	X399 C	ADD: DATA BASE STATION OPER		\$ 245.00	\$	245.00
1	X39	ENH: RD-LAP 19.2 AIR PROTOCOL		\$ 700.00	\$	700.00
1	X113	ALT: CONVERTER DC TO DC 48/60V HP		\$ 140.00	\$	140.00
1	X882	ADD: 7.5' OPEN RACK-QUANTAR, 48RU		\$ 346.50	\$	346.50
1	X84	DEL: WIRELINE, QUANTAR STN		\$ (350.00)	\$	(350.00)
1	X153	ADD: HARDWARE, RACKMOUNT				
1	U752	ADD: POWER CORD, 12 FT AC, QTAR HONEYCOMB ANTENNA SYS		\$ 35,00	\$	35.00
1	DSWIJD86204S	COMB WAV-G 851-869 4CH 7/16 ANT, 15		\$ 5,235.20	5	5,235.20
1	DQHRN8610686204	RFS COMBINER HARNESS FOR 4 CH COMBINER HONEYCOMB TENSR		\$ 750.00	\$	750.00
1	DSPREM891830	UNIVERSAL ENCLOSURE TENSR 800		\$ 1,320.00	\$	1,320.00
2	DSPREM890220	DC POWER SUPPLY 48 VDC		\$ 1,100.00	\$	2,200.00
1	DSPREM892060	8T1 E1 IF CARD 32K WITH MODEM		\$ 1,980.00	\$	1,980.00
2	DSPREM880160	CPU 8 T1 E1 CROSS CONNT		\$ 4,950.40	S	9,900.80
1	DSPREM801460	DUAL T1E1 WAN W/ RELAYS 1:N REDUNDA		\$ 2,147.20	\$	2,147.20
1	DSPREM801060	DUAL T1 E1 WAN CARD		\$ 1,870.40	\$	1,870.40
1	DSPREM822560	10 PORT LD-SRU CARD		\$ 3,300.00	\$	3,300.00
			TOTAL LINE ITEM AMOUNT		\$	39,220.40
11.28			SERVICES	s 1,400.00	s	15,796.60
			HONEYCOMB TOTAL		5	55,017.00
OULDY !	EDUC LUB BOUMOUS					

#### QUOTE TERMS AND CONDITIONS;

- 1. Quotes are exclusive of all installation and programming charges (unives expressly stated) and all applicable taxes.
- 3. Title will pass upon shipment, risk of loss will pass upon delivery to purchaser's facility.
- Ordered equipment may be returned for a full refund, less a 20% restocking fee, if the equipment is returned unused and undamaged in its original packaging with in six months after shipment.
- 5. Prices quoted are valid for thirty(30) days from the date of this quote
- 6. Unless otherwise stated, payment will be due within thirty days after invoice.
- Motorola's standard equipment warranty which will be turnished upon request) applies to all ordered equipment
  MOTOROLA DISCLAIMS ALL OTHER WARRANTIES WITH RESPECT TO THE ORDERED PRODUCTS, EXPRESS OR IMPLIED
  INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.
- B. MOTOROLAS TOTAL LIABILITY ARISING FROM THE ORDERED PRODUCTS WILL BE LIMITTED TO THE PURCHASE PRICE OF THE PRODUCTS WITH RESPECT TO WHICH LOSSES OR DAMAGES ARE CLAIMED, IN NO EVENT WILL MOTOROLA

BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES.

9. These terms will prevail over any inconsistent or additional terms on any purchase order submitted by the purchaser.

City of Austin Price Agreement No.S060120 dated 12/19/05 Amendment #4 to CSA contract Page 1 of 4



CITY OF AUSTIN
Purchasing Office
Financial & Administrative Services
P.O. Box 1088
Austin, Tx 78767

S060120

From: Vic Chanmugam, C.P.M.

December 19, 2005

Specialist Senior Buyer Phone: (512) 974-2030 Fax : (512) 974-2388

Brice Shelton
Motorola Communications & Electronics, Inc.
7700 West Parmer Lane
Austin Tx 78729

Tel: (512) 996-6976 Fax: (512) 996-7951

Dear Brice,

Infrastructure component of Regional Radio System
Amendment #4 to Motorola's Communications System Agreement
Increased by \$8,056,000 to add digital capability to Williamson County RRS, build an in interface between Austin/Travis County RRS & improve coverage

Amendment #4 dated 12/16/05 of our contract with Motorola for the Communications System Agreement dated December 27, 2000, provided for improvements to the infrastructure to

- · add digital capability to the Williamson County trunked radio system,
- build an interface between the Austin/Travis County RRS and the Williamson County RRS, and
- · improve coverage for for users of the Austin/Travis County RRS.

As the scope of services and equipment have still to be spelled out, the Agreement provides for work to be done only against PG documents issued by Mike Simpson to be supported by the Contractor's quotation and a detailed Statement of Work, System Description, Acceptance Test Plan, Equipment List and mutually agreed upon payment milestones. Please start designing and costing out these new additions to the infrastructure component to be added to the Regional Trunked Radio System.

I have set up a new Price Agreement No: S060120 for \$8,056,000. This serves as your assurance of payment for the work to be done by you as described above. Please be advised that only Mr. Mike Simpson, Manager of the Wireless Communications Services Office of the City's Communications and Technology Management (CTM) Department has been authorized to place orders and issue PG documents with you against this Price Agreement. To let us make you prompt payment for services rendered against this contract, please ensure that your invoices for these additional equipment and services are sent to the Contract Manager, Mr. Mike Simpson and they refer to this Price Agreement Number. He will approve payments under this contract.

Thank you for your continued interest in doing business with the City of Austin.

Sincerely,

Vic Chanmugam, C.P.M., Specialist Senior Buyer Finance and Administrative Services Department

Vic Channugum

cc. Mike Simpson, Manager WCSO, Al Rusk, CTM, Tel: 974-1677

VC/vc - Enclosure

City of Austin Price Agreement No.S060120 dated 12/19/05 Amendment #4 to CSA contract Page 2 of 4

Price Agreement No.: S060120

Purchasing Office Date Issued: December 19, 2005

Supplement to Price Agreement No.: S010222 for

infrastructure component of RRS

Distribution: **DEPT:** Finance & Administrative Services,

CTM Office Attn: Mike Simpson, Al Rusk

Purchasing Office Attn: Urcha Dunbar Crespo; Lynda

Thorpe

CSN/SCC, Commodity Code No.: 72574

Commodity/Service: Supplement to infrastructure component of Trunked

Radio project with Motorola which

adds digital capability to Williamson County

RRS.

builds gateway between the Williamson County RRS and Austin/Travis County RRS, and

improves coverage

Estimated Dollar Value: \$8,056,000.

The total, not to exceed amount for both infrastructure

component Price Agreements, is \$46,166,203

Motorola Communications and Electronics, Inc.

Cash Payment Terms: Net 30

F.O.B. Point Destination, Freight Prepaid

December 19, 2005 to December 18, 2006 Contract Period:

Extension Options: None

Source, Address, Phone and Source

No.:

Attn: Brice Shelton Tel: (512) 996-6976

Fax: (512) 996-7145 MOT3322000 1

S010222 Supplements Agreement No.:

Buyer Name and Signature:

Vic Chanmugam, Specialist Senior Buyer

Purchasing Office, (512) 974-2030

Vic Channugam

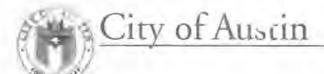
REVIEWED AND APPROVED:

N/A

Urcha Dunbar-Crespo, Acting Purchasing Officer

Reference File No.: S060120

Rx 560IS002800 Requisition No.: Solicitation No:: VC06300002 Council approval 11/17/05



6<sup>th</sup> Modification 10/27/05 Page 1 of 5



CITY OF AUSTIN
Purchasing Office
Financial & Administrative Services
P.O. Box 1088
Austin, Tx 78767

From: Vic Chanmugam, C.P.M.

October 27, 2005

Specialist Senior Buyer Phone: (512) 974-2030 Fax : (512) 974-2388

Brice Shelton Motorola Communications & Electronics, Inc. 7700 West Parmer Lane Austin Tx 78729 Tel: (512) 996-6976 Fax: (512) 996-7951

Dear Brice,

Subscriber portion of Trunked Radio project with Motorola
Price Agreement No: S011253
Increased by \$2,472,848 for additional public service radios
Part of \$11m authorized in original contract for additional radio units

Section 5.1.2 of our contract with Motorola dated December 27, 2000, gave the City the right and option to purchase up to 3500 additional units of User Equipment at an estimated cost of \$11,000,000 and this purchase was authorized by City Council resolution dated 11/30/00. These optional purchases have been funded by several City Departments from time to time as shown in the Table attached. I am accordingly now increasing Price Agreement No: S011253 in our General Ledger by another \$2,472,848 to cover additional purchases on behalf of public service radios.

Price Agreement No: S011253 serves as your assurance of payment for the subscriber portion of this program. Please be advised that only Mr. Robert Turner, Manager of the Trunked Radio Project in the RDMT Office of the Department of Finance & Administrative Services and Mike Simpson, Manager of the Wireless Communications Services Division of the City's Communications and Technology Management (CTM) Department have been authorized to place orders with you against this Price Agreement. To let us make you prompt payment for services rendered against this contract, please ensure that your monthly invoices for these services are sent to the Contract Manager, Mr. Robert Turner and they refer to this Price Agreement Number. He will approve payments under this contract.

Thank you for your continued interest in doing business with the City of Austin.

Sincerely,

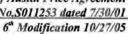
Vic Chanmugam, Specialist Senior Buyer

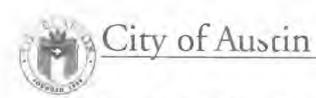
Finance and Administrative Services Department Purchasing Office, (512) 974-2030

Vic Channugam

cc. Robert Turner, Tel: 974-3046; Urcha Dunbar-Crespo, Purchasing Office, Al Rusk, Tel: 974-1677

VC/vc - Enclosure

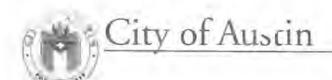




Page 2 of 5

# Reconciliation of Amounts entered into PASM Table in AFS2

Date	Description	Amount	City References	Authorization
7/3/01	Price Agreement S011253 for subscriber units set up in AFS2	\$17,823,386.00	Rx 560IS001670 BD VC01100046	RCA 7/30/01 for \$73.96m approving negotiation and executuion of the original 911 Radio contract with Motorola
4/25/03		\$3,201,393 for new radio mobile data devices (Change Order #10)	Rx 740RDC0065 BD VC03300017	RCA 3/20/03 for \$4.4m to upgrade mobile data system including \$3.2m for MDT's. Amendment #3
10/16/03		\$4,570,000 for new subscriber radio units (Change Oder #11)	Rx 740RD000048 BD VC04100001	
12/15/03		\$1,000,000 for new subscriber radio units	Memo	
5/11/04		\$2,016,334 for new subscriber radio units for AE, ABIA, APD and Watershed Depts	Rx 740RD000061 BD VC04100009	RCA 7/30/01 for \$74m
2/23/05		\$940,818 for new subscriber radio units for AE, ABIA, AFD, Parks & Homeland Defense (APD & COA)	Rx 740RD000074 BD VC05100004	includes authorization to purchase subscriber radio units fo \$11m
10/27/05		\$2,472,848 for new public service radios	Rx 560IS002774 BD VC05100005	
		TOTAL IN PASM TABLE FOR S011253 = \$32,024,779		\$11,000,000 disbursed from allocation of subscriber radio units authorized on on 7/30/01; \$3,201,393 allocated for purchase of mobile data units authorized on 3/20/03; and \$17,823,386 from initial authorization on 7/30/01.



Purchasing Office

6" Modification 10/27/05 Page 3 of 5

Price Agreement No.: S011253 Date originally Issued: July 30, 2001

Date of 1st increase: April 25, 2003 - \$3.2m for MDT's Date of 2<sup>nd</sup> increase: October 16, 2003 - \$4.57m for radios Date of 3rd increase: December 15, 2003 - \$1m for radios Date of 4th increase: May 11, 2004 - \$2.016m for radios Date of 5th increase: February 23, 2005 - \$0.94m for radios

Date of this increase: October 27, 2005 - \$2.47m for radios

**DEPT:** Finance & Administrative Services. CTM Office Attn: Robert Turner, Al Rusk

Purchasing Office Attn: Urcha Dunbar Crespo; Lynda

Thorpe 72574

CSN/SCC, Commodity Code No.:

Commodity/Service:

Estimated Dollar Value:

Distribution:

Subscriber portion of Trunked Radio project with Motorola, to include new data radio mobile devices

Increased today by \$2,472,848 for a total not to exceed amount of \$32,024,779

Net 30 Cash Payment Terms:

F.O.B. Point Destination, Freight Prepaid Contract Period: Feb 27, 2001 to May 21, 2006

**Extension Options:** 

Source, Address, Phone and Source

No.:

Motorola Communications and Electronics, Inc.

Attn: Brice Shelton Tel: (512) 996-6976 Fax: (512) 996-7145 MOT3322000 1

Replaces Agreement No.:

Buyer Name and Signature:

Vic Chanmugam, Specialist Senior Buyer

Purchasing Office, (512) 974-2030

Vic Channugam

REVIEWED AND APPROVED: N/A

Urcha Dunbar-Crespo, Deputy Purchasing Officer

S011253

N/A

Reference File No .: Requisition No.: Rx 560IS002774 Solicitation No:: VC05100004

11/30/00; 7/30/01 and 3/20/03 Council approval

VC/vc



#### **AMENDMENT NO. 3**

#### TO THE

#### COMMUNICATIONS SYSTEM AGREEMENT

#### FOR THE

#### 911 RDMT RADIO PROJECT

This Amendment No. 3 ("Amendment") to the Communications System Agreement dated December 27, 2000 ("Agreement") is made and entered into effective June 15°, 2004 by and between the parties thereto, MOTOROLA, INC., a Delaware corporation ("Motorola"), by and through the North America Group of its Commercial, Government, and Industrial Solutions Sector ("CGISS"), and the CITY OF AUSTIN ("City"), a Texas home-rule municipal corporation of the State of Texas acting for itself and on behalf of the other governmental entities that have executed the 800 MHz Trunked Voice Radio System Implementation Interlocal Agreement ("Interlocal Agreement"), collectively referred to herein as the "Customer."

The above referenced Communications System Agreement is amended as set forth below.

1. The Agreement contains the following provision that provides certain option rights for the Customer:

#### 5.1.2 OPTION TO PURCHASE

Customer shall have the right and option to purchase up to 3500 additional units of User Equipment for seven years after Phase I Acceptance at an estimated cost of ELEVEN MILLION DOLLARS AND NO/100 (\$11,000,000) ("Optional Subscriber Equipment") at the price set forth in the Pricing Agreement, Exhibit E, for an estimated total contract amount of SEVENTY-TWO MILLION TWO HUNDRED FORTY-NINE THOUSAND FOUR HUNDRED SEVENTY NINE DOLLARS AND NO/100 (\$72,249,479).

Contract No. 98-14028 06-17-04

- 2. The Customer hereby elects to exercise its option to purchase additional units of Optional Subscriber Equipment as provided in Section 5.1.2 of the Agreement in accordance with the pricing set forth in the Pricing Agreement, Exhibit E, thereto in an amount not to exceed \$11,000,000.
- 3. Motorola will invoice the Customer upon delivery of equipment and such invoice will be due within thirty (30) days of receipt thereof.

This Amendment No. 3 is hereby made a part of the Communications System Agreement and all terms and conditions therein contained are applicable. The Communications System Agreement, all prior amendments and change orders and this Amendment No. 3 shall be collectively referred to as the "Agreement".

BY THE SIGNATURES affixed below, Amendment No. 3 is hereby executed and incorporated into and made a part of the above-referenced Communications System Agreement.

REVIEWED AND APINDLED AS TO FORM

MOTOROLA
CONTRACTS AND CUMPLIANCE DEPT.

MOTOROLA, INC.	CITY OF AUSTIN
By: Wanul annel	By: William June C. ispo
Name: DANIEL RUSSELL MCEI VICE-PRESIDENT	Title: Urcha M. Dunbay-Crospo
Title: AND DIRECTOR OF FINANCE	Title: Urcha M. Dunbar-Crespo
Date: JUNE 21, 2004	Date: 6/23/04



# AMENDMENT NO. 2 TO THE

# COMMUNICATIONS SYSTEM AGREEMENT

#### FOR THE

## 911 RDMT RADIO PROJECT

This Amendment No. 2 to the Communications System Agreement dated December 27, 2000 is made and entered into effective October 11, 2001 by and between the parties thereto, MOTOROLA, INC., a Delaware corporation ("Motorola"), by and through the North America Group of its Commercial, Government, and Industrial Solutions Sector ("CGISS"), and the CITY OF AUSTIN ("City"), a Texas home-rule municipal corporation of the State of Texas acting for itself and on behalf of the other governmental entities that have executed the 800 MHz Trunked Voice Radio System Implementation Interlocal Agreement ("Interlocal Agreement"), collectively referred to herein as the "Customer."

The above referenced Communications System Agreement is amended as stated below.

Section 3, SCOPE OF AGREEMENT, is amended by the addition of the following paragraph 3.12:

#### 3.12 OTHER PRODUCTS AND SERVICES

The Customer shall have the right to purchase additional radio communications products and services as specified in Exhibit E, page 10 of 12, Current and Future Discounts. Payment for additional products will be made net 30 days after delivery of the products and receipt of invoice and payment for additional services will be made net 30 days after completion of the services and receipt of invoice, unless otherwise mutually agreed to by the Customer and Motorola.

New pages containing the foregoing sentences, copies of which are attached hereto and captioned "Amendment No. 2, Attachment 2.1, 2.2 and 2.3", will be substituted for original contract pages, being pages 14, 15, and 16 of 45 in the Communications System Agreement.

This Amendment No. 2 is hereby made a part of the Communications System Agreement and all terms and conditions therein contained are applicable. The Communications System Agreement and this Amendment No. 2 shall be collectively referred to as the "Agreement".

**BY THE SIGNATURES** affixed below, Amendment No. 2 is hereby executed and incorporated into and made a part of the above-referenced Communications System Agreement.

MOTOROLA, INC.	CITY OF AUSTIN
By: Steve Pat	By: Zadie Clark
Name: STEVE PALM AREA CONTROLLER Title:	Name: EDDIE CLARIC Title: DEPUTY PUNCHASING OFFICER
Date:	Date: ///04/01
REVIEWED AND NETROLEU AS TO FORM  SCOTT POSSESSE 11/2/01  SEOTT DODGE DATE	

MOTOROLA
CONTRACTS AND COMPLIANCE DEPT.



CITY OF AUSTIN
Purchasing Office
Financial & Administrative Services
P.O. Box 1088
Austin, Tx 78767

From: Vic Chanmugam, C.P.M.

May 19, 2006

Specialist Senior Buyer Phone: (512) 974-2030 Fax : (512) 974-2388

Brice Shelton Motorola Communications & Electronics, Inc. 7700 West Parmer Lane Austin Tx 78729 Tel: (512) 996-6976 Fax: (512) 996-7951

Dear Brice,

# Subscriber portion of Trunked Radio project with Motorola Price Agreement No: S011253 Extended for another 12 months

Part of \$11m authorized in original contract for additional radio units

Section 5.1.2 of our contract with Motorola dated December 27, 2000, gave the City the right and option to purchase up to 3500 additional units of User Equipment at an estimated cost of \$11,000,000 and this purchase was authorized by City Council resolution dated 11/30/00. These optional purchases have been funded by several City Departments from time to time as shown in the Table attached. I am accordingly now extending Price Agreement No: S011253 in our General Ledger for another 12 months to cover additional purchases of public service radios. There is a balance outstanding of \$581,856.52

Price Agreement No: S011253 serves as your assurance of payment for the subscriber portion of this program. Please be advised that only Mr. Mike Simpson, Manager of the Wireless Communications Services Office of the City's Communications and Technology Management (CTM) Department has been authorized to place orders with you against this Price Agreement. To let us make you prompt payment for services rendered against this contract, please ensure that your monthly invoices for these services are sent to the Contract Manager, Mr. Mike Simpson and they refer to this Price Agreement Number. He will approve payments under this contract.

Thank you for your continued interest in doing business with the City of Austin.

Sincerely,

Vic Chanmugam, Specialist Senior Buyer

Finance and Administrative Services Department

Vic Chanmugam

Purchasing Office, (512) 974-2030

cc. Mike Simpson, Tel: 974-9066; Urcha Dunbar-Crespo, Purchasing Office, Al Rusk, Tel: 974-1677

VC/vc - Enclosure

# Reconciliation of Amounts entered into PASM Table in AFS2

Date	Description	Amount	City References	Authorization
7/3/01	Price Agreement S011253 for subscriber units set up in AFS2	\$17,823,386.00	Rx 560IS001670 BD VC01100046	RCA 7/30/01 for \$73.96m approving negotiation and executuion of the original 911 Radio contract with Motorola
4/25/03		\$3,201,393 for new radio mobile data devices (Change Order #10)	Rx 740RDC0065 BD VC03300017	RCA 3/20/03 for \$4.4m to upgrade mobile data system including \$3.2m for MDT's. Amendment #3
10/16/03		\$4,570,000 for new subscriber radio units (Change Oder #11)	Rx 740RD000048 BD VC04100001	
12/15/03		\$1,000,000 for new subscriber radio units	Memo	
5/11/04		\$2,016,334 for new subscriber radio units for AE, ABIA, APD and Watershed Depts	Rx 740RD000061 BD VC04100009	
2/23/05		\$940,818 for new subscriber radio units for AE, ABIA, AFD, Parks & Homeland Defense (APD & COA)	Rx 740RD000074 BD VC05100004	RCA 7/30/01 for \$74m includes authorization to purchase subscriber
10/27/05		\$2,472,848 for new public service radios	Rx 560IS002774 BD VC05100005	radio units fo \$11m
5/19/06		Extended for another 12 months until 5/21/07	Rx 560ITC00004 BD VC06100001	
		TOTAL IN PASM TABLE FOR S011253 = \$32,024,779 Balance outstanding: \$581,856.52		\$11,000,000 disbursed from allocation of subscriber radio units authorized on on 7/30/01; \$3,201,393 allocated for purchase of mobile data units authorized on 3/20/03; and \$17,823,386 from initial authorization on 7/30/01.

Price Agreement No.: S011253 Purchasing Office Date originally Issued: July 30, 2001

> Date of 1st increase: April 25, 2003 - \$3.2m for MDT's Date of 2<sup>nd</sup> increase: October 16, 2003 - \$4.57m for radios Date of 3rd increase: December 15, 2003 - \$1m for radios Date of 4th increase: May 11, 2004 - \$2.016m for radios Date of 5th increase: February 23, 2005 - \$0.94m for radios Date of this increase: October 27, 2005 - \$2.47m for radios Date of this extension: May 19, 2006 - extension of time

Distribution: **DEPT:** Finance & Administrative Services Department,

WCSO, CTM Division Attn: Mike Simpson, Al Rusk Purchasing Office Attn: Urcha Dunbar Crespo; Lynda

Thorpe 72574

CSN/SCC, Commodity Code No.:

Commodity/Service:

Subscriber portion of Trunked Radio project with Motorola, to include new data radio mobile devices

Total not to exceed amount of \$32,024,779

Net 30

Estimated Dollar Value: Cash Payment Terms:

F.O.B. Point Contract Period: Extension Options:

Source, Address, Phone and Source

No.:

Destination, Freight Prepaid Feb 27, 2001 to May 21, 2007

N/A

Motorola Communications and Electronics, Inc.

Attn: Brice Shelton Tel: (512) 996-6976 Fax: (512) 996-7145 MOT3322000 1

Replaces Agreement No.:

Buyer Name and Signature:

Vic Chanmugam, Specialist Senior Buyer

Purchasing Office, (512) 974-2030

Vic Channugam

REVIEWED AND APPROVED: N/A

Urcha Dunbar-Crespo, Deputy Purchasing Officer

S011253

Reference File No.: Requisition No.: Rx 560ITC00001 Solicitation No:: VC06100001

Council approval 11/30/00; 7/30/01 and 3/20/03

VC/vc



#### AMENDMENT NO. 1

#### TO THE

#### COMMUNICATIONS SYSTEM AGREEMENT

#### FOR THE

#### 911 RDMT RADIO PROJECT

This Amendment No. 1 to the Communications System Agreement dated December 27, 2000 is made and entered into effective January 4, 2001 by and between the parties thereto, MOTOROLA, INC., a Delaware corporation ("Motorola"), by and through the North America Group of its Commercial, Government, and Industrial Solutions Sector ("CGISS"), and the CITY OF AUSTIN ("City"), a Texas home-rule municipal corporation of the State of Texas acting for itself and on behalf of the other governmental entities that have executed the 800 MHz Trunked Voice Radio System Implementation Interlocal Agreement ("Interlocal Agreement"), collectively referred to herein as the "Customer."

The above referenced Communications System Agreement is amended as stated below.

#### 1. COMMUNICATIONS SYSTEMS AGREEMENT

Section 2, DEFINITIONS, is amended by the addition of the following Definition between the Definitions of "System Description" and "UCC":

"Travis County" or "County" is defined as set forth in Paragraph 1. of Amendment No. 1 to this Communications System Agreement dated January 4, 2001.

A new page containing the foregoing Definition, a copy of which is attached hereto and captioned "Amendment No. 1, Attachment 1.1", will be substituted for original contract page, being page 10 of 45 in the Communications System Agreement. The above added Definition refers to the succeeding paragraph which fully defines "Travis County" or "County." as follows:

"Travis County" or "County", a political subdivision of the State of Texas, its respective officers and departments including, but not limited to the officers of the following offices and departments as defined in the Constitution and Laws of the State of Texas: The Travis County Commissioners Court, the Travis County Judge, the Travis County Commissioners, Travis County District Clerk, Travis County Clerk, Travis County District Attorney, Travis County Attorney, Travis County Sheriff, the Travis County District Courts, Travis County Courts (statutory and constitutional), Travis County Probate Court(s), Travis County Justices of the Peace, Travis County Constables, the Travis County Corrections and Supervision Department, Travis County Justice and Public Safety Division, the Travis

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County Juvenile Court, the Travis County Pretrial Services Department, Travis County Tax Assessor Collector, Travis County Treasurer, Travis County Auditor, Travis County Purchasing Office, Travis County Transportation & Natural Resources, and the Travis County Information & Telecommunications Systems Department (ITS).

#### 2. SOFTWARE LICENSE AGREEMENT

**SECTION 2, GRANT OF LICENSE**, is amended in its entirety to read as follows:

#### Section 2 GRANT OF LICENSE

Motorola hereby grants to Licensee a personal, non-exclusive, perpetual license under all of Motorola's applicable proprietary rights to use Software including any new upgrades, new releases, or revisions of the Software released by Motorola to the Licensee and Documentation in accordance with the terms of this Agreement and the Software Subscription Agreement (SSA) (after the ESS Period, as defined in the Communications Systems Agreement, the SSA will apply only if purchased by Licensee for additional periods). For purpose of this Agreement, any use, rights granted to Licensee hereunder, will also be extended to Eligible Users, including Travis County, as defined in the Communications Systems Agreement, who have issued Purchase Orders in accordance with the terms of the Communications System Agreement for Equipment.

A new page containing the foregoing amended paragraph, a copy of which is attached hereto and captioned "Amendment No. 1, Attachment 1.2", will be substituted for original contract page, being page 3 of 8 in the Software License Agreement. All other terms and conditions of the Communications System Agreement and Software License Agreement remain the same.

This Amendment No. 1 is hereby made a part of the Communications System Agreement and all terms and conditions therein contained are applicable. The Communications System Agreement and this Amendment No. 1 shall be collectively referred to as the "Agreement".

**BY THE SIGNATURES** affixed below, Amendment No. 1 is hereby executed and incorporated into and made a part of the above-referenced Communications System Agreement.

MOTOROLA, INC.

By: Daniel Daniel P. Russell

Name: DANIEL P. Russell

Name: ZNOIE CLANK

Name: ZNOIE CLANK

Title: DIRECTOR OF FINANCE

WESTERN DIVISION

Date: FEBRUARY 7, 2001

REVIEWED JANUARY 1000 LUSTORM

SCOTT DODGE

MOTOROLA

CITY OF AUSTIN

By: Zddle Clark

Name: ZNOIE CLANK

Title: DEJMTY LUNCHASING OFFICER

Date: 2/01/01

Contract No. 98-14028

CONTRACTS AND COMPLIANCE DEPT.

# COMMUNICATIONS SYSTEM AGREEMENT

Between
The City of Austin
And
Motorola, Inc.

911 RDMT Radio Project

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# Communications System Agreement

Motorola Inc. a Delaware corporation ("Motorola"), by and through the North America Group of its Commercial, Government, and Industrial Solutions Sector ("CGISS"), and the City of Austin, a Texas home-rule municipal corporation ("City"), acting for itself and on behalf of the other governmental entities that have executed the 800 MHz Trunked Voice Radio System Implementation Interlocal Agreement ("Interlocal Agreement"), Exhibit H herein, collectively referred to herein as the "Customer," enter into this Communications System Agreement (the "Agreement"), effective as of the date signed by City (the "Effective Date"), pursuant to which Customer will purchase and Motorola will provide Customer with an 800 MHz Trunked Radio Communications System.

WHEREAS, the City and other local governments desire to acquire a consolidated, multichanneled, trunked radio communications system that would provide inter-department capability between all agencies and thus, replace a variety of dated single channel radio systems for public service and safety agencies;

WHEREAS, the City requested proposals in June, 1998, from qualified and experienced radio communication firms to provide, install, customize, and support a 800 MHz regional trunked radio communication system covering the Austin/Travis County metropolitan area as described in the City's Request for Proposal VC 98300024;

WHEREAS, Motorola responded to the above stated City's Request for Proposal and represented that its services and products for the acquisition, installation, and maintenance of the 800 MHz radio communications system will meet the City's requirements and specifications as described in this Agreement;

WHEREAS, after City Purchasing review of the vendor proposals and recommendation to the City Council, the Council authorized the City Manager on May 11, 2000, to negotiate a contract with Motorola for the radio communication system as stated in Resolution 000511-33;

NOW THEREFORE, the parties hereto, for in consideration of these promises and mutual obligations herein undertaken, do hereby agree as follow:

#### SECTION 1 EXHIBITS

The Exhibits below are hereby incorporated into and made a part of this Agreement. In interpreting this Agreement and resolving any ambiguities, the main body of this Agreement will take precedence over the Exhibits and any inconsistency between the Exhibits will be resolved in the order in which the Exhibits appear below.

Motorola Software License Agreement ("Software License Agreement") Exhibit A

> Motorola Software Attachment 1

Attachment 2 Non-Motorola Software

Exhibit B Technical Exhibits

	Exhibit B-1	Statement of Work ("SOW"), November 28, 2000			
		Appendix A Appendix B Appendix C Appendix C Appendix D  Work Breakdown Structure, November 11, 2000 Project Schedule, December 26, 2000 Change Order Form General Circuit Descriptions and Specifications			
	Exhibit B-2	Acceptance Test Plan ("ATP"), November 28, 2000			
	Exhibit B-3	System Description ("System Description"), November 28, 2000			
	Exhibit B-4	Equipment List ("Equipment List")			
Exhibit C	Enhanced System Support Statement of Work ("ESS Plan")				
Exhibit D	Maintenance and Support Agreements				
	Exhibit D-1	Motorola Service Agreement ("Service Agreement")			
	Exhibit D-2	Software Subscription Agreement ("Subscription Agreement")			
		Appendix A System Options, Term, and Fees			
Exhibit E	Payment and I	Pricing Agreement ("Pricing Agreement"), December 26, 2000			
Exhibit F	Motorola Proposal dated August 16, 1999 and amendments thereto ("Motorola Proposal")				
Exhibit G	City of Austin Request for Proposal, No. VC 98300024, issued June 22, 1998 and all amendments thereto ("RFP")				
Exhibit H	800 MHz Trunked Voice Radio System Implementation Interlocal Agreement ("Interlocal Agreement")				

#### SECTION 2 DEFINITIONS

Except as expressly provided otherwise in this Agreement or in Exhibits A-H, the following capitalized terms apply to this Agreement.

"Acceptance Test Plan" ("ATP") shall mean the negotiated, mutually agreed upon method of testing the System as set forth in Exhibit B-2.

"Agreement" means this agreement, including all exhibits attached thereto, which is the binding legal agreement between the Customer and Motorola for the purchase of the Communications System. As to subscriber equipment, the Customer has agreed to issue separate Purchase Orders for the subscriber equipment required by them pursuant to the Interlocal Agreement in accordance with Texas Government Code Chapter 791. No deliveries of subscriber equipment will be made by Motorola under the Agreement until an order is placed by each Eligible Users by the issue of such a Purchase Order.

"Appropriate", "Appropriated" or "Appropriation" means the adoption by the City Council of Austin, Texas or an Eligible User's budget for a fiscal year that includes payments to be made under the Agreement during the respective fiscal year.

"Authorized City Representative" means a person designated by the City Manager to act for the City of Austin.

"City" means the City of Austin, a Texas home-rule municipal corporation.

- "Communications System" or "System" is the 800 MHz Trunked Radio Communications System, including the Equipment, Software, Documentation, and System installation as described in the System Description, Statement of Work, Acceptance Test Plan, and Equipment List.
- "Customer" means the City of Austin, and the participating governmental agencies or entities of the Radio Communications Coalition that have executed the Interlocal Agreement, Exhibit H. Wherever indemnification, warranty, confidentiality, and other clauses refer to the "Customer", they shall include not only the City of Austin, but also the other Eligible Users; and the Confidential Information of the Customer shall include the Confidential Information of all of the Eligible Users.
- "Deliverables" means the goods, products, materials, Documentation, Equipment, Software, and/or Services to be provided to the Customer by Motorola for the System.
- "Disadvantaged Business Enterprise" is defined in 49 CFR 23.62 or other applicable federal regulations.
- "Documentation" shall mean all user/operation and training manuals, detailed system design document, acceptance testing plan and results, as-built documentation, and other materials or information describing the Motorola and Non-Motorola Equipment and Software, as hereinafter defined, its performance characteristics, technical features and other relevant information reasonably required for use of the 800 MHz trunked radio system, and Software, including all physical media upon which the materials or information are provided.
- "Eligible User" means a governmental entity that has entered into the Interlocal Agreement with the City of Austin as the same may be amended.
- "Equipment" is the equipment for the System specified in the Equipment List, Exhibit B-4, including all physical equipment, hardware, and structures, including mobiles, portables, and control stations and their accessories, dispatch consoles, alarm systems, system management system, microwave system, towers, shelters, generators, back-up power systems, and associated facilities required to construct the System including but not limited to mechanical, magnetic, electrical, or electronic devices (e.g. antennas, feed-lines, amplifiers, connectors, interfaces).
- "Exhibit" or "Exhibits" shall mean the Exhibits attached to this Agreement, including their attachments, which are incorporated as part of this Agreement.
- "Final System Acceptance" shall mean: 1) Phase II Acceptance Tests have been successfully completed; 2) all Motorola provided Phase II training has been provided; 3) all Phase II Deliverables have been received; 4) all Phase II punch list items have been resolved, in accordance with the Acceptance Test Plan; and 5) all other applicable contractual obligations regarding installation, testing, and training between Motorola and the Customer have been met. Customer cannot commence use of the Phase II console equipment for primary communications until the successful completion of Phase II Acceptance Tests. In no event shall payment constitute acceptance or any conditional acceptance operate as acceptance under this Agreement.
- "Interlocal Agreement" is the 800 MHz Trunked Voice Radio System Implementation Interlocal Agreement, attached hereto as Exhibit H, and entered into between the City of Austin and other governmental agencies or entities concerning their participation in the 800 MHz Trunked Radio Communications System being provided by Motorola pursuant to this Agreement.

12-26-00

"Minority-Owned Business" is defined in chapter 5-7, 1992 City Code.

"Motorola Software" is software whose copyright is owned by Motorola.

"Non-Motorola Software" is third party software whose copyright is owned by a party other than Motorola, including both software licensed directly by a third party vendor to the Customer or sublicensed by Motorola to the Customer.

"Offer" means a complete signed response submitted to City in response to a Request for Proposal.

"Phase" refers to a phase of the Project; the Project will consist of two phases, "Phase I" refers to the initial engineering and design, manufacture, delivery, installation, optimization, testing and training of the fixed network portion of the System, as described in the Agreement and its Exhibits. "Phase II" refers to the move of a portion of the System installed in Phase I to the City's proposed new communications building upon completion of the communications building and the installation, optimization, testing and training of the remainder of the System, primarily consisting of additional dispatch consoles, all in accordance with the terms of this Agreement and its Exhibits.

"Phase I Acceptance" shall mean: 1) Phase I Acceptance Tests have been successfully completed; 2) all Motorola provided Phase I training has been provided; 3) all Phase I Deliverables have been received; and 4) all Phase I punch list items have been resolved, in accordance with the Acceptance Test Plan. The operation or use of the System for testing and evaluation purposes (including the 60 day Operational Burn-In Test as defined in the Acceptance Test Plan) shall not constitute acceptance. Customer cannot commence use of the System for primary communications until the successful completion of the acceptance for Phase I. In no event shall payment constitute acceptance or any conditional acceptance operate as acceptance under this Agreement.

"Project" shall mean furnishing, installation, and implementation by Motorola of a complete analog and digital 800 MHz trunked radio Communications System in accordance with the terms of this Agreement and Exhibits, including the provision of all Equipment, materials, Software, and Services necessary to install, test, successfully operate, and warranty the Communications System.

"Purchase Order" is an order placed by the City Purchasing Office for the purchase of Deliverables written on the City's standard Purchase Order form and which, when accepted by Motorola, becomes a contract. Purchase Orders may also be issued by the other Eligible Users on their standard Purchase Order form for Deliverables required by such Eligible Users, in which case, such purchase order is Motorola's authority to deliver and invoice that Eligible User for the Deliverables specified and the Eligible User's commitment to purchase the Deliverables for an agreed upon price. Such Purchase Orders are subject to the applicable terms and conditions of this Agreement, including the Software License Agreement. No pre-printed or similar terms on any Purchase Order or other document shall have any force or effect to change the terms, covenants, and conditions of this Agreement. The City will not be responsible for the commitments made by such Eligible User. The resolution of any disputes between Motorola and such Eligible User must be pursued with such Eligible User under the overall framework of this Agreement.

"Purchasing Office" refers to the Purchasing Office in the Financial and Administrative Services Department for the City of Austin.

"Request for Proposal" or "RFP" refers to the solicitation issued by the City of Austin, being RFP No. VC 98300024, issued June 22, 1998, and all amendments thereto requesting an offer be made by vendors in accordance with Texas Local Government Code Section 252.042 for an 800 MHz Trunked Radio Communications System.

"Services" means the services provided by Motorola as set forth in this Agreement.

"Software" means programs, firmware and other licensed information for use with the System and includes all future enhancements and core releases purchased by the Customer. The term includes Motorola and any Non-Motorola Software that is furnished with the Communications System. Software includes all physical media upon which the materials or information are provided.

"Statement of Work" means the document that specifies work to be completed and the responsibilities of both parties as set forth in Exhibit B-1.

"System" See the definition for "Communications System", supra.

"System Description" means the complete description of the Communications System as set forth in Exhibit B-3.

"Travis County" or "County" is defined as set forth in Paragraph 1. of Amendment No. 1 to this Communications System Agreement dated January 4, 2001.

"UCC" refers to the Uniform Commercial Code, as enacted by the State of Texas; whenever a term defined by the UCC is used in the Agreement, the UCC shall control, unless otherwise defined in the Agreement.

"Woman-Owned Business" is defined in chapter 5-7, 1992 City Code.

#### SECTION 3 SCOPE OF AGREEMENT

#### 3.1 PERFORMANCE STATEMENT

Motorola acknowledges that it is the intent of the Customer to purchase a wide-area 800 MHz SmartZone simulcast/multicast radio system in accordance with the terms of this Agreement that provides 95% area coverage for analog and digital portable radios worn on the hip in a swivel case as follows:

- a. Within buildings with up to 10 dB of loss county-wide/City of Austin limits and ExtraTerritorial Jurisdiction ("ETJ") as defined in the ATP;
- b. Within buildings with up to 20 dB of loss as defined in the ATP; and
- c. Within Critical Areas as defined in the ATP.

Although specific tasks are outlined in the Statement of Work, this Agreement is performance based and Motorola shall provide the Customer with an 800 MHz Trunked Radio Communications System meeting the Customer's radio coverage reliability and functional requirements as set forth in this Agreement.

#### 3.2 PROJECT RESPONSIBILITIES

Motorola and Customer agree to perform their responsibilities in accordance with the Project Schedule set forth in the Exhibit B-1 (Statement of Work).

#### 3.3 SCOPE OF WORK

Motorola shall engineer, manufacture, assemble, deliver, install, optimize, test, and fully implement the Project; provide user training, first year System support and maintenance, and System warranty in accordance with this Agreement and Exhibits, and shall provide the following:

- a. a complete, functional analog and digital 800 MHz Trunked Radio Communications System that conforms to all standards and requirements of this Agreement and Exhibits;
- b. all Equipment, Software, Documentation, supplies, personnel and labor, and Services required to install a complete functional Communications System as set forth in Exhibit B-1 (Statement of Work), and Exhibit B-4 (Equipment List), in accordance with Exhibit B-3 (System Description) relating to functional requirements, and with respect to performance standards, Exhibit B-2 (Acceptance Test Plan);
  - c. a one year warranty of the Communications System as described in Section 9 herein which is included in the price for the Communication System.
  - d. maintenance and support services in accordance with Exhibit C (Enhanced Systems Support Plan Statement of Work) and equipment maintenance as stated in Exhibit D-1 (Service Agreement); and software subscription services as set forth in Exhibit D-2 (Software Subscription Agreement).
  - e. training classes for Customer personnel (who shall be determined by the Customer) as set forth in Exhibit B-1 (Statement of Work);
  - f. personnel as required to perform the inspection and tests of the Communications System as set forth in Exhibit B-2 (Acceptance Test Plan);
  - g. licenses, in the name of the Customer and in a form approved by Customer, to all of the Software and Documentation furnished as part of the Communications System, in accordance with Exhibit A (Software License Agreement).

#### 3.4 CHANGE ORDERS

#### 3.4.1 CHANGE ORDER PROCEDURE

Either party may request changes within the scope of work for this Agreement. A change order request must describe any changes in any of the Deliverables required for this Project. Within thirty (10) days after receipt of the Customer's change order request, Motorola must provide the Customer with a proposal describing any changes in the Deliverables, functions, timing of delivery, assignment of personnel, price, and performance schedule given the proposed change. Customer will review such proposal and contact Motorola within 10 days of receipt of proposal. If a requested change causes an increase or decrease in the price of or time required for the performance of this Agreement, Motorola shall describe, in detail, the basis for the price or time adjustment. Before any changes are implemented, the Change Order Form, as attached as Appendix C, Exhibit B-1 (SOW), must be accepted and approved by both parties. Motorola is not obligated to comply with requested changes unless and until both parties execute a written change order.

## 3.4.2 CHANGE ORDER PRICE ADJUSTMENTS

To the extent that additional price or price savings result from a change in the required Deliverables, Motorola shall obtain additional Deliverables (including drop ship and OEM products) and provide them to the Customer at the product/material/service Price set forth in the Pricing Agreement, Exhibit E.

## 3.4.3 SYSTEM EQUIPMENT CANCELLATION CHANGE ORDER

If any unused Motorola manufactured Equipment is cancelled solely at the discretion of the Customer after it has been shipped, and that item of Equipment cannot be used elsewhere in the Project, the Customer shall pay the return shipping cost and shall be granted credit against the Total Contract Price, less a restocking charge of 15% for the returned Equipment.

#### 3.4.4 ACCEPTANCE TEST PLAN DEFICIENCY

If Motorola is required to add or upgrade Equipment, Services, or Software to meet the Acceptance Test Plan requirements in Exhibit B-2 (Acceptance Test Plan), Motorola shall do so at Motorola's expense.

#### 3.5 MAINTENANCE SERVICE

During the first year after Phase I Acceptance, maintenance services and software support are provided pursuant to the terms of this Agreement, the ESS Plan (Exhibit C) and the Software Subscription Agreement (Exhibit D-2). Such services are included in the purchase price. After the Warranty Period, Customer may purchase maintenance services and software support for the Communications System pursuant to a separately executed Service Agreement (Exhibit D-1) and Software Subscription Agreement.

#### 3.6 MOTOROLA SOFTWARE

Any Motorola Software furnished will be licensed to Customer solely according to the terms of the Software License Agreement attached as Exhibit A, except for any Motorola provided Software Development Kit which will have a separate license (e.g. Elite Applications Programmers Interface (API), SmartZone Computer Aided Dispatch Interface (CADI)).

#### 3.7 NON-MOTOROLA SOFTWARE

Non-Motorola Software provided by Motorola as part of the System will be licensed either under the Software License Agreement (Exhibit A) or under a separate software license agreement directly between Customer and the owner of the copyright to the Non-Motorola Software. The license that will apply depends on whether the owner of the copyright has granted to Motorola a license to such Non-Motorola Software with the right to sub-license it to Motorola's customers. If so, the Software License Agreement will apply. If not, then the license will be direct between the Customer and the copyright owner. Motorola has evaluated the proposed System and the Non-Motorola Software that is to be provided as part of the System. Based upon this evaluation, Motorola represents that the Non-Motorola Software being provided as part of the System is from Sun Microsystems (Solaris operating software on the site and Smartzone controllers); Microsoft (operating software); Hewlett-Packard (OpenView software); and Wonderware In Touch (GUI for the MOSCAD). Non-

Motorola Software the copyright of which is owned by Microsoft is directly licensed pursuant to the standard Microsoft "shrink wrap" license. Non-Motorola Software the copyright of which is owned by Wonderware is directly licensed pursuant to the standard Wonderware license for the In Touch software product. The other Non-Motorola Software is sub-licensed to Customer pursuant to the Motorola Software License Agreement.

#### 3.8 SOFTWARE WARRANTY CLAIMS

The software warranties are found in the applicable software license agreements. With respect to Non-Motorola Software which is not covered by the Software License Agreement but is covered by a separate software license agreement directly between the Customer and the owner of the copyright to the Non-Motorola Software, Motorola's duties as the 'single point of contact' for software warranty claims shall include participating with and assisting the Customer's representatives in asserting and handling such warranty claims. This particular duty of Motorola will be performed by the System Support Center with assistance from the Motorola 'Customer Support Manager (CSM)' and other appropriate Motorola employees.

#### 3.9 DISCONTINUANCE OF SOFTWARE SUPPORT OR SALE OF CGISS

#### 3.9.1. DISCONTINUANCE DEFINED

Discontinuance of support as used in this Section means that Motorola discontinues its Software Subscription Agreement program and does not offer any comparable software support program.

#### 3.9.2 TERMS AND PROCEDURE

In the event that:

- Motorola discontinues support for: (1) an item of Motorola Software furnished under the Agreement; and (2) subsequent releases of such Motorola Software, if any; and
- b) City (1) is, and remains, in use of the Software and not in breach of this Agreement, the Software License Agreement for the System or other applicable license agreement for the System, and (2) City executes and maintains a Software Subscription Agreement for the term of City's use of the Software, (Motorola recommends that the City maintain the Motorola Software by periodically accepting new enhancements and core releases for the 3600 Baud Astro platform provided under the Software Subscription Agreement in order to keep the System generally updated with the current System Software),

then at City's request:

c) Motorola shall, at its sole discretion and election either: (1) continue support for such Software item; or (2) arrange for support by an entity that has access to the source code for such Software item; or (3) within thirty (30) calendar days of the discontinuance of support or as mutually agreed to by the parties, grant City a license, under separate terms and conditions that are mutually agreed to by the parties, to use Motorola-owned source code corresponding to the item of Motorola Software for City's internal use by City's employees, agents, consultants, and independent contractors, provided that prior to their access to such source code, City's agents, consultants, and independent contractors enter into a confidentiality agreement in form and substance that is reasonably satisfactory to Motorola, solely as a trouble analysis aid for isolating, diagnosing, and fixing problems in such

Software. Motorola shall provide the source code to the City within a reasonable time not to exceed thirty (30) calendar days or as mutually agreed to by the parties.

## 3.9.3 SALE OR ACQUISITION OF CGISS

In the event that Motorola's Commercial, Government and Industrial Solutions Sector ("CGISS") is sold to or acquired by an entity that is unacceptable to the City due to past performance problems, as documented by the City, then such event shall be treated as a discontinuance of support pursuant to the above provisions in subsection 2 c) and Motorola will select option 2.c(1), 2.c(2) or 2.c(3).

## 3.10 SPARES

The City shall maintain spare parts furnished by Motorola to allow immediate restoration of operation of the System infrastructure. In the event that these parts are consumed, Motorola will provide replacement stock via emergency request and air freight within twenty four hours of the Equipment failure.

#### 3.11 REPLACEMENT PARTS

Motorola's intent is to offer replacement parts for the System to meet the Customer's needs, however, all vendors are subject to the action of suppliers. Motorola will make available replacement parts for the Infrastructure for Motorola manufactured equipment for a minimum of 10 years following the date of Phase I Acceptance. Motorola will supply replacement parts for User Equipment for a period of seven (7) years following the date of shipment

However, if a product is cancelled and parts are not available, upon trade-in for a replacement radio System component, Motorola will provide the Customer with a prorated credit of the replaced radio System component toward the purchase of an equivalent model of the same item (the credit will be based on a straight line pro-ration and assume a seven year life of the replaced radio System component).

#### SECTION 4 TERM

#### 4.1 TERM OF AGREEMENT

The term of this Agreement shall commence on the Effective Date, and unless amended or terminated in accordance with other provisions of this Agreement, end on the later of (i) seven years from Phase I Acceptance, or (ii) Motorola's completion of all its obligations as set forth in the Agreement.

#### 4.2 NOTICE TO PROCEED

Execution of this Agreement will serve as Notice to Proceed. Motorola agrees not to commence work until delivery of all required bonds and certificates of insurance, acceptable to the City and in no event prior to the first scheduled project kickoff meeting.

## SECTION 5 PRICE AND PAYMENT AGREEMENT

#### 5.1 CONTRACT PRICE

#### 5.1.1 INITIAL CONTRACT AMOUNT

The Customer shall pay Motorola, and Motorola shall accept as full compensation and payment for the System, including first year warranty/maintenance as stated in Exhibit E, (Pricing Agreement), the amount of:

- a. THIRTY FOUR MILLION TWO HUNDRED FORTY-FOUR THOUSAND EIGHT HUNDRED AND SEVENTY DOLLARS AND N0/100 (\$34,244,870) for Phase I Infrastructure and Services and Phase II Services; plus
- TWENTY MILLION FIVE HUNDRED FIFTY THOUSAND FIVE HUNDRED AND FIFTY ONE DOLLARS AND NO/100 (\$20,550,551) for City User Equipment; plus
- c. SIX MILLION FOUR HUNDRED FIFTY-FOUR THOUSAND AND FIFTY-EIGHT DOLLARS AND NO/100 (\$6,454,058) for Travis County User Equipment.

The total initial contract amount shall not exceed the total of the above of SIXTY ONE MILLION TWO HUNDRED FORTY NINE THOUSAND FOUR HUNDRED SEVENTY NINE DOLLARS AND NO/100 (\$61,249,479) ("Contract Price").

#### 5.1.2 OPTION TO PURCHASE

Customer shall have the right and option to purchase up to 3500 additional units of User Equipment for seven years after Phase I Acceptance at an estimated cost of ELEVEN MILLION DOLLARS AND NO/100 (\$11,000,000) ("Optional Subscriber Equipment") at the price set forth in the Pricing Agreement, Exhibit E, for an estimated total contract amount of SEVENTY-TWO MILLION TWO HUNDRED FORTY-NINE THOUSAND FOUR HUNDRED SEVENTY NINE DOLLARS AND NO/100 (\$72,249,479).

#### 5.2 CONTRACT PAYMENT

The Phase 1 Infrastructure and Services Price shall be due and payable in accordance with the Milestone Payment Schedule in Exhibit E. However, no Milestone Payment shall become due and payable until all work comprising the Project Milestone (including without limitation the delivery and installation of the Deliverables) has been completed and accepted by the City, in writing, in accordance with Exhibit B-2 (Acceptance Test Plan), when applicable. The Customer is precluded from making payments prior to the receipt of Deliverables (advance payments). Customer agrees to make payments to Motorola thirty (30) days after a proper invoice is received for each accepted Milestone. Every request for payment shall include an invoice that reflects the work performed and refers to the appropriate Milestone Payments set forth in Exhibit E, Pricing Agreement. Invoices shall be submitted to the following address as applicable:

Phases I and II	User Equipment
Trunked Radio Project Manager Attn: Robert Turner City of Austin RDMT Office 3600 Manor Road Building 2048 Austin, Texas 78723	Submit invoices to the payment address specified in the Eligible User's Purchase Order.

#### 5.3 MILESTONE PAYMENT SCHEDULE

Payments will be made as Milestones are completed, in accordance with the schedules set forth in the Pricing Agreement, Exhibit E and Section 5.2.

#### 5.4 ADDITIONAL PRODUCTS

For seven (7) years after the Phase I Acceptance, Customer may submit purchase orders for additional Equipment manufactured by Motorola's Commercial Government Industrial Solutions Sector (CGISS) which is currently available at the time of order at the applicable manufacturer's published equipment price less the discounts set forth in Pricing Agreement, Exhibit E.

## 5.5 ELECTRONIC DATA INTERCHANGE ("EDI")

If Customer and Motorola have agreed to a convention for processing electronic data interchange ("EDI") transactions, purchase orders may be transmitted electronically. Each purchase order must specifically refer to this Agreement and will be an offer by Customer subject to Motorola's acceptance. Except for pricing and delivery terms, which must be stated on the purchase order, Customer and Motorola agree that the applicable terms of this Agreement and Exhibits will be the terms and conditions that govern the purchase and sale of products identified on such purchase orders. Customer and Motorola agree that payment for all additional products so purchased will be due thirty (30) days from receipt of invoices or Deliverable, whichever is later as stated in Section 5 Payment provision.

# 5.6 PRICES FOR EQUIPMENT AND TECHNOLOGY SUPPORT

Prices for maintenance and support shall be as set forth in the schedules in the Pricing Agreement, Exhibit E.

#### 5.7 OVERDUE NOTICES

Overdue invoices will bear interest at a rate of the lesser of one percent per month or the maximum rate allowed by law. If the payment is not timely made, however, for a reason for which Customer may withhold payment hereunder, interest shall not accrue until ten days after the grounds for withholding payment have been resolved.

## 5.8 NON-APPROPRIATION

City's payment obligations are payable only and solely from funds Appropriated and available for the purpose of this purchase. The absence of Appropriated or other lawfully available funds shall render the Contract null and void to the extent funds are not Appropriated or available and any deliverables delivered but unpaid shall be returned to Motorola. City shall provide Motorola written notice of the failure of the City to make an adequate Appropriation for any fiscal year to pay the amounts due under this Agreement, or the reduction of any Appropriation to an amount insufficient to permit the City to pay its obligations under this Agreement.

In no event shall the Customer be obligated to pay or otherwise compensate Motorola for any lost or expected future profits. No penalty shall accrue to Customer in the event termination or reduction of Motorola equipment, products, or services is exercised, and the Customer shall not be liable for any future payments due or for any damages as a result of termination of the Agreement under this provision.

## 5.9 PAYMENT FOR CHANGES

The Customer shall not be obligated to pay for any changes to the Project unless a Change Order Form has been executed by the Customer and Motorola in accordance with Section 3.4. Only that portion of the Change Order work that has been completed as part of a Project Milestone may be included in the Milestone Payment for the Project Milestone. Payment for Change Orders not related to a Project Milestone will be as mutually agreed upon.

## 5.10 RETAINAGE

In order to secure Motorola's performance under this Agreement, the Customer shall retain one percent (1%) of each Milestone payment due to Motorola under Phase 1 of the Project. The amounts retained will be released upon contract reconciliation and Motorola's delivery to the City and the City's acceptance of the final completion of all requirements for Phase I of this Agreement.

# SECTION 6 SITES AND SITE CONDITIONS

## 6.1 CUSTOMER RESPONSIBILITIES

In addition to its responsibilities described in the Agreement and Exhibits, including the Statement of Work, Customer agrees to procure any necessary construction permits, building permits, zoning variances and the like, provide access to the sites for this System as identified in Exhibit B-1 (Statement of Work) as requested by Motorola, and have such sites available for installation of the Equipment by Motorola in accordance with the Statement of Work.

## 6.2 SITE AVAILABILITY

This Agreement is predicated on the utilization of sites and site configurations, which have been selected either by the Customer or Motorola as contained in Motorola's proposal and as revised in the Exhibits. In either situation, should it be determined by either party during the course of

performance for this Agreement that the sites or configurations are no longer available or desired, new or replacement sites or configurations will be selected and approved by both Motorola and the Customer. If any price or schedule adjustments are necessary as a result of these new or replacement sites, such adjustments will be made in accordance with Change Order procedures set forth in Section 3.4.

## SECTION 7 TRAINING

Training is included in this Agreement as set forth in Exhibit B-1 (Statement of Work). Both parties agree to notify each other immediately if a date change for a scheduled training program is required. Motorola and the Customer will work closely together to minimize any impact such changes may have.

#### SECTION 8 ACCEPTANCE

#### 8.1 SYSTEM ACCEPTANCE

Phase I Acceptance shall occur as described in the definitions, Section 2 of this Agreement. Final System Acceptance shall occur as described in the definitions, Section 2 of this Agreement. The successful completion of the Phase I Acceptance and the Final System Acceptance shall be the sole criteria for Customer's acceptance of the System.

## 8.2 ACCEPTANCE PROCEDURES

Motorola shall notify the Customer in writing when Motorola determines that a Phase is ready for acceptance testing in accordance with the Statement of Work and Acceptance Test Plan. The parties will then perform the Acceptance Test Plan in accordance with the mutually agreed upon schedule. Upon achieving Phase I Acceptance and Final System Acceptance, the parties will execute a certificate of acceptance for each Phase as each Phase is completed.

#### SECTION 9 WARRANTY

## 9.1 WARRANTY PERIOD

## 9.1.1 WARRANTY PERIOD DEFINED

Except as otherwise provided in Subsections 9.1.2, 9.1.3, and 9.1.4, the "Warranty Period" for the Phase I portion of the System shall be a one (1) year period, commencing from the date of Phase I Acceptance or upon the successful completion of the 60 day Operational Burn-In Test as stated in Exhibit B-2 (Acceptance Test Plan), whichever comes first, of the Phase I portion of the System. The "Warranty Period" for Equipment purchased during Phase II shall be a one (1) year period, commencing from the date of Final System Acceptance or upon the successful completion of the 60 day Operational Burn-In Test as stated in Exhibit B-2 (Acceptance Test Plan), whichever comes first, of the Phase II portion of the System.

## 9.1.2 WARRANTY PERIOD FOR CONSOLES

Concerning the console Equipment for Phase II as defined in the Statement of Work that is provided in Phase I but which is not installed until Phase II, the Warranty Period will be a one (1) year period, commencing from the date of Final System Acceptance or upon the successful completion of the 60 day Operational Burn-In Test as stated in Exhibit B-2 (Acceptance Test Plan), whichever comes first, of the Phase II portion of the System, but in no event longer than three (3) years from the date of shipment from the factory of the console Equipment. The warranty for mobiles, portables, and portable batteries ordered, installed, and included in the 60 day Operational Burn-In Test for Phase I, will begin upon successful completion of the 60 day Operational Burn-In Test.

## 9.1.3 WARRANTY PERIOD FOR MOBILES AND PORTABLES

The warranty for mobiles and portables installed by Motorola during Phase II, will be one year from installation. As to all other mobiles and portables, warranty shall commence upon installation with a total warranty not to exceed 15 months from the date of shipment. All portable batteries delivered after Phase I will be subject to Motorola's standard battery warranty.

#### 9.1.4 WARRANTY PERIOD EXTENDED FOR RECURRING DEFECTS

During the Warranty Period, should any Equipment experience the same recurring valid warranty claim three or more times within a six month period, then once Motorola has restored the operation of the Equipment, the Warranty Period for that item will be either the remaining time of the original Warranty Period, or six (6) months from the date of restoration, whichever is longer.

### 9.1.5 WARRANTY CLAIMS

Customer must promptly notify Motorola in writing of any warranty claims but in no event later than one month after the expiration of the applicable Warranty Period.

## 9.2 SYSTEM WARRANTY

Motorola warrants to the City that during the Warranty Period for the Phase I portion of the System, the Phase I portion of the System shall perform in accordance with the System performance specifications pertaining to Phase I as set forth in Exhibit B, Technical Exhibits, free from any "System Defects," as defined below. This Phase I System Warranty extends only to Equipment, Software, and Services provided by Motorola under this Agreement as part of the Phase I portion of the System. If, at any time during the Warranty Period, City or Motorola discovers any "System Defect," Motorola shall, entirely at its own cost, provide the Equipment, Software, and/or Services to correct such System Defect.

A "System Defect" shall mean a malfunction, failure, or design error which is (1) re-producible, (2) caused by Motorola, and (3) diminishes the functionality, performance and operational requirements set forth in Exhibit B, Technical Exhibits, to this Agreement. A "malfunction" shall mean a material problem with the System, causing it to function in manner that is contrary to Motorola's obligations under this Agreement. A "failure" shall mean a deficiency that directly causes the System or a major subsystem to cease functioning. A "design error" shall mean a material and adverse deviation from the Motorola-approved design. The standard for determining whether a malfunction, failure, or design error occurred and for construing the terms "material" and "adverse" shall be an objectively

reasonable standard of the respective design engineer(s) of the parties who are qualified to make such determinations. A System Defect does not include a defect that is covered by the Equipment Warranty, Limited Services Warranty, or the Software Warranty; claims for those matters will be handled under those warranties. A System Defect does not include problems that are from (1) causes or events beyond Motorola's control, e.g., the construction of a building or other structure that adversely affects microwave path reliability or Radio Frequency ("RF") coverage, or the addition of additional frequencies at System sites that cause RF interference or intermodulation; acts of God or other natural causes as defined in Section 11.2; or (2) parties beyond Motorola's control, e.g., the Customer or its employees, contractors, consultants or agents.

If City reasonably believes that a System Defect has occurred, City shall make a claim under this System Warranty. The claim shall be in writing, or if verbal, shall be followed up in writing within five (5) business days thereafter and shall include any information supporting the System Defect claim. Motorola will promptly diagnose the claim and will promptly resolve any System Defect. Any problems with the System that do not constitute a System Defect shall be handled as follows: (1) Motorola will not charge for diagnosing System Warranty claims concerning the System so long as the City has a reasonable belief that a System Defect has occurred; and (2) Motorola will provide non-diagnostic services and additional equipment only if a change order is executed.

# 9.3 EQUIPMENT WARRANTY

## 9.3.1 WARRANTY TERMS

During the applicable Warranty Period, Motorola warrants the Equipment will be free from material defects (i.e. meaning a defect that impacts the successful operation of the Equipment) in the manufacture, materials and workmanship under normal public safety use; conforms in all material respects to the manufacturer's specifications, drawings, and functional descriptions; conforms to all applicable Federal, State and local laws, rules and regulations. The Equipment, as delivered, shall be new and unused and in first class condition or recycled items, and not used or reconditioned. However, Motorola makes no representations or warranties concerning the materials or components contained in the Equipment. All Equipment and its materials and components, are fully covered by the warranties provided by Motorola. If any of the Equipment is defective, Motorola will at its option and cost (1) repair the defective Equipment, (2) replace it with the same or equivalent Equipment, or (3) if despite using reasonable efforts Motorola is unable to repair or replace the defective Equipment, then refund the purchase price of the defective Equipment. If Motorola is unable or unwilling to repair or replace defective or non-conforming Equipment, Customer may reduce the quantity of Equipment it may be required to purchase under the Agreement from Motorola and may purchase conforming Equipment from other sources. In such event, Motorola shall pay to Customer upon demand the increased cost of conforming Equipment, if any, actually incurred by Customer. Repaired or replaced Equipment is warranted for the balance of the original applicable Warranty Period or for ninety (90) days from delivery to Customer, whichever is later. All replaced parts of the Equipment shall become the property of Motorola.

## 9.3.2 WARRANTY EXCLUSIONS

This warranty does not apply to:

- Defects or damage resulting from use of the Equipment in other than its normal and customary manner.
- b. Defects or damage occurring from misuse, accident, water exceeding the Equipment specifications, or neglect.
- c. Defects or damage occurring from testing, maintenance, installation, alteration, modification, or adjustment not provided by Motorola pursuant to this Communications System Agreement.
- d. Equipment that has been subjected to unauthorized Equipment modifications, disassembly or repairs (including the addition to the Equipment of non-Motorola supplied equipment if not authorized by Motorola) which adversely affect performance of the Equipment or interfere with Motorola's normal warranty inspection and testing of the Equipment to verify any warranty claim.
- e. Portable Batteries (because they carry their own separate limited warranty).
  - f. Equipment which, due to illegal or unauthorized alteration of the software/firmware in the Equipment, does not function in accordance with Motorola's published specifications or with the FCC type acceptance labeling in effect for the Equipment at the time the Equipment was initially distributed from Motorola.
  - g. Minor scratches or other cosmetic damage to Equipment surfaces that does not affect the operation of the Equipment.
  - Software (because Software is warranted pursuant to the warranty in the Software License Agreement).
  - i. Normal and customary wear and tear.

Customer may purchase the Express Service Protection plan concerning mobiles and portables. If the Customer purchases this plan, then the Warranty Period for those items of covered Equipment shall be extended an additional two (2) years and the Equipment Warranty above shall apply except Customer shall pay freight costs to the repair depot for these additional two (2) years.

#### 9.4 WARRANTY OF TITLE

Motorola warrants that when title to the Equipment furnished under this Agreement passes to Customer, as provided herein, Customer will receive good and indefeasible title to the Equipment free and clear of any liens, claims, security interests, and encumbrances. Motorola shall indemnify and hold Customer harmless from and against all adverse title claims to the Equipment.

### 9.5 SERVICES WARRANTY

Motorola warrants that, during the Warranty Period for the applicable Phase, the installation and repair services provided under this Agreement for such Phase shall be performed in a good and workmanlike manner in accordance with generally accepted industry standards and practices, the provisions of this Agreement, and all applicable Federal, State and local laws, rules and regulations. If Motorola performs such services in a manner that does not conform to this warranty, Motorola will at its cost re-perform the services in accordance with this warranty.

If it becomes necessary for the Customer to contract with another vendor for warranty repairs, due to inability or failure of Motorola to perform such repairs, Motorola shall reimburse the Customer for all invoices for labor, materials required and the shipping/handling costs thereof, to perform such repairs, within 30 days from presentation of such Customer invoices. This shall only occur after Motorola has been given written notice to respond and correct any problem. Motorola will have thirty (30) days from the receipt of such notice either to resolve the problem or to provide a plan of action that is acceptable to Customer to correct such problem. The cost limitation for such repairs will not exceed the parts and labor replacement price of the repair.

## 9.6 YEAR 2000 EXPRESS WARRANTY

During the Warranty Period as defined in Section 9 herein, Motorola warrants that each hardware, software, and firmware product delivered under this Agreement ("Product") shall be able to accurately process date data (including, but not limited to, calculating, comparing, and sequencing) from, into, and between the year 1999 and the year 2000, including leap year calculations, when used in accordance with the Product documentation provided by Motorola, provided that all products (e.g., hardware, software, firmware) used in combination with such Product properly exchange date data with it. All Product manufactured by parties other than Motorola are warranted hereunder based upon Year 2000 statements, representations, and warranties made by these parties to Motorola. Motorola has not verified the content of those Year 2000 statements but is merely republishing those statements, representations, and warranties for purposes of this warranty. For any Product that utilizes third party computer operating system software, such as Microsoft Windows NT 4.0 or Windows 95, that third party software is warranted only with respect to the specific functions of it that are necessary in the performance of the Communication System provided under this Agreement. In the event of breach of this Year 2000 Warranty, Motorola will make available the following remedies at its expense: 1) repair the non-compliant Product according to specifications; 2) replace the non-compliant Product with the same or equivalent Product; or 3) refund the amount of the license fee or purchase price of the affected Product paid by Customer. Except as provided herein, nothing in this warranty statement shall be construed to limit any rights or remedies provided elsewhere in this Agreement with respect to matters other than Year 2000 performance.

## 9.7 MOTOROLA SOFTWARE WARRANTY

Motorola Software is warranted in accordance with the terms of the Software License Agreement attached as Exhibit A, except for any Motorola provided Software Development Kit which will have a separate license (e.g. Elite Applications Programmers Interface (API), SmartZone Computer Aided Dispatch Interface (CADI))

#### 9.8 WARRANTY NOT ASSIGNABLE

These express warranties as set forth in this Section are extended by Motorola to the Customer purchasing or leasing the System for commercial, industrial, or governmental use only, and is not assignable or transferable.

#### 9.9 THIRD PARTY WARRANTY PASS THROUGH

Concerning any Equipment provided to Customer under this Agreement that is manufactured by a party other than Motorola and such Equipment has a manufacturer's warranty with a term longer than the Warranty Period, Motorola hereby assigns to Customer the manufacturer's warranty effective as of the expiration of the Warranty Period. During the Warranty Period, Motorola shall be responsible for administering and enforcing all third-party warranty provisions of the 800 MHz Equipment and other Deliverables provided by Motorola pursuant to this Agreement. After the expiration of the Warranty Period, any third-party remaining warranties for Equipment or other Deliverables supplied by Motorola to fulfill the requirements of this Agreement shall be administered by the Customer.

#### 9.10 NO DISABLING CODE

Motorola represents and warrants to Customer that Motorola has no knowledge that the Deliverables contain any (a) software routine designed to disable any of the Deliverables automatically with the passage of time or under the positive control of someone other than Customer or an authorized Motorola representative, or (b) software routine designed (i) to permit access unauthorized by Customer to any of the Deliverables; (ii) to disable, erase, or otherwise harm any of the Deliverables or data; or (iii) to perform any other similar unauthorized actions.

### 9.11 DISCLAIMER

MOTOROLA DISCLAIMS ALL IMPLIED WARRANTIES OR CONDITIONS, , INCLUDING THE IMPLIED WARRANTIES OR CONDITIONS OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. WARRANTY CLAIMS ARE SUBJECT TO THE LIMITATION OF LIABILITY PROVISION SET FORTH IN SECTION 16 OF THIS AGREEMENT.

# SECTION 10 FEDERAL COMMUNICATIONS COMMISSION ("FCC") LICENSES AND AUTHORIZATIONS

In accordance with the Statement of Work, Customer and Motorola agree to perform the stated duties in connection with obtaining FCC licenses for the System and FCC frequency coordination and licensing of the microwave component of the System. Customer agrees that all FCC licenses and authorizations required for installation and use of the Communications System must be obtained prior to the scheduled installation of the Equipment. In no event will Motorola or any of its employees be an agent or representative of Customer in FCC matters. Customer is solely responsible for obtaining all FCC licenses and for complying with FCC rules.

#### SECTION 11 DELAYS

## 11.1 PROJECT IMPLEMENTATION

Successful project implementation will require cooperation and fairness between the parties. Because it is impractical to provide for every contingency which may arise during the course of performance of this Agreement, the parties agree to notify the other if they become aware that any condition will significantly delay performance. The parties will agree to reasonable changes to the

Project Schedule in the Statement of Work by completing and executing a written Change Order Request Form (Appendix C) of Exhibit B-1 (Statement of Work) of this Agreement.

# 11.2 FORCE MAJEURE

Neither party shall be liable for any default or delay in the performance of its obligations under this Agreement if, while and to the extent such default or delay is caused by acts of God, unusual weather conditions, fire, riots, labor disruptions, sabotage or any other cause beyond the reasonable control of such Party ("Force Majeure"). In the event of default or delay in contract performance due to any of the foregoing causes, then the time for completion of the services will be extended by a mutually agreeable period of time reasonably necessary to overcome the effect of such failure to perform.

# 11.3 PROJECT DELAYS

Customer will make available to Motorola the sites when scheduled and Customer will not otherwise unreasonably delay or prevent Motorola's performance of its responsibilities. If Customer materially delays Motorola's performance, the Project Schedule as set forth in Appendix B of Exhibit B-1 (Statement of Work) may be extended by the parties, and the parties will execute a Change Order, if required to adjust the project schedule and/or to compensate Motorola for reasonable charges incurred because of such delays. Such charges include, but are not limited to, costs incurred by Motorola and/or its subcontractors for additional freight, warehousing and handling; suspending and re-mobilizing the work; additional engineering and standby time calculated at then current laborday rates; and preparing and implementing a "work around" plan.

Customer may delay scheduled delivery or other due dates by written Notice to Motorola if Customer deems it is in its best interest. If such delay causes an increase in the cost of work or extends the work schedule in the Agreement, Customer and Motorola shall negotiate an equitable adjustment for costs incurred by Motorola in the Contract Price, extend the work schedule as appropriate, and execute a Change Order. Motorola must assert its right to an adjustment within forty-five (45) days from the date of receipt of the notice of delay. Failure to agree on the adjusted price shall be handled under the Dispute Resolution process specified herein.

If Motorola materially delays the Customer, the Project Schedule as set forth in the Statement of Work may be extended, and the parties will execute a Change Order pursuant to the Change Order process herein.

# 11.4 LIQUIDATED DAMAGES

# 11.4.1 EXTENSION OF PROJECT SCHEDULE

Motorola agrees to pay to the City liquidated damages for Motorola's failure to achieve Phase I Acceptance as required in the Project Schedule. The maximum amount of liquidated damages that Motorola is obligated to pay to City under this Agreement will be: \$2,000 per day for the first 30 days; \$3,000 per day for the next 30 days; and \$5,000 per day for the next 180 days. If City wishes to assert a claim that it is owed liquidated damages, it must first give formal written notice to Motorola. Delays that are excused under Section 11.2 and delays caused by the Customer or its employees, representatives, agents, or other contractors are not covered. Motorola and City agree that, although such damages are difficult to ascertain, liquidated damages as more fully described below are a

reasonable approximation of the amount of damages that City would suffer as a result of Motorola's failure to achieve Phase I Acceptance as scheduled, and that such liquidated damages are not a penalty. These liquidated damages are intended to compensate City as its sole and exclusive remedy for all damages caused by such delay. In determining the liquidated damages amount, Motorola and City have taken into consideration the types and anticipated amounts of possible damages that the City might incur as well as the other provisions of this Agreement that protect City concerning Motorola's performance, such as the surety bonds and the milestone payments. This liquidated damages provision is for the benefit of only the City and not for any other Eligible User purchasing off of this Agreement and only relates to the original System.

# 11.4.2 MAJOR OUTAGES

A "Major Outage" is a Severity 1 level failure, as defined in the ESS Plan.

During the Warranty Period and any time the Equipment is subject to a Motorola Service Agreement, if restoration of the Major Outage is not achieved within one (1) day, Motorola agrees to pay Customer the sum of \$1,500 per day until the restoration is achieved, not to exceed a maximum amount of \$45,000.

Motorola is not responsible for any penalty for a Major Outage due to a force majeure event as stated in Section 11.2 herein. Motorola agrees, however, to assist Customer in identifying any and all problems and to work with Customer in resolving them.

#### 11.4.3 SERVICE REPAIR.

Motorola agrees to credit the City's account for post Warranty maintenance provided by Motorola for the System for failure to respond, failure to ship Equipment for repair, failure to return a repaired mobile and portable, and failure to return a part or field replaceable unit as set forth in Exhibit C, ESS.

#### SECTION 12 DEFAULT AND TERMINATION

## 12.1 DEFAULT

If Motorola 1) fails to timely complete and perform its material obligations or duties in the performance of this Agreement, 2) fails to provide adequate written assurance of performance upon the demand of City; 3) becomes insolvent or seeks relief under the bankruptcy laws of the United States; or 4) makes fraudulent statements to the City in relation to the Project ("Event of Default"), Motorola shall be in default of this Agreement. City agrees to give Motorola written notice of such default. Motorola will have thirty (30) days from the receipt of such notice either to cure the default or to provide a plan of action that is acceptable to City to cure the default. In the event that the City determines the plan is unacceptable or Motorola fails to cure the default, the City shall have the right to terminate the Agreement for cause.

#### 12.2 TERMINATION WITH CAUSE

If Motorola fails to timely cure the Event of Default or fails to submit a plan of action that is acceptable to the City, City may terminate this Agreement for cause, in whole or part, by giving written notice to Motorola. If the Agreement is terminated for cause, Motorola shall relinquish to the City all interest, title, and ownership in and to the System and Deliverables delivered to and in possession of the City including but not limited to perpetual use of the Software, subject to the terms of the Software License Agreement. Additionally, if the City terminates this Agreement for cause, the City may remove Motorola from the City's vendor list for three (3) years and any competitive bid response submitted by Motorola to City may be disqualified for up to three (3) years.

#### 12.3 DAMAGE UPON DEFAULT

Motorola is liable for any damages, costs, losses, and expenses incurred by the City as a result of Motorola's default including without limitation, actual damages, costs, cost of cover, reasonable attorneys' fees, court costs, prejudgment interest and post-judgment interest at the maximum lawful rate. If City completes the Communications System through a third party, Motorola is liable for the reasonable costs exceeding the Contract Price that are necessary for completing the Communications System as required by this Agreement. City agrees to use its best efforts to mitigate such damages and costs. Motorola's liability under this Section is subject to the limitations of the Section entitled Limitation of Liability of this Agreement. City is entitled to pursue any other remedy available at law or equity. The City shall have no financial obligation to compensate Motorola for terminated Deliverables shipped after the Notice of Termination. THE REMEDIES PROVIDED IN THIS SECTION OF THE AGREEMENT WILL BE THE FULL EXTENT OF THE CITY'S REMEDIES IN THE EVENT OF DEFAULT.

#### 12.4 TERMINATION WITHOUT CAUSE

City shall have the right to terminate this Agreement, in whole or in part, without cause any time upon thirty (30) days' prior written notice. Upon receipt of a notice of termination, Motorola shall promptly cease all further work pursuant to the Agreement, with such exceptions, if any, specified in the notice of termination. If this Agreement is terminated without cause, Motorola shall relinquish to the City all interest, title, and ownership, including but not limited to perpetual use of any proprietary rights in and to the System and Deliverables delivered to and in possession of the City, subject to the terms of the Software License Agreement. Title to Software shall not pass to City at any time. City shall be liable to Motorola for Equipment and Services provided to the date of notice to terminate and for reasonable, allowable, and allocable costs incurred by Motorola in the termination of subcontracts, removal of installation, and test equipment, and other costs directly related to an unforeseen and abrupt termination without cause by City. Motorola shall submit documentation to support all claimed costs.

If Motorola timely submits sufficient documentation and City approves thereof, City shall pay Motorola, to the extent of funds Appropriated or otherwise legally available for such purposes and not otherwise recoverable from other sources by Motorola, for all Deliverables received and Services performed and obligations incurred prior to the date of termination and for reasonable, allowable, and allocable costs incurred by Motorola in the termination of subcontracts, removal of installation, and test equipment, and other costs directly related to an unforeseen and abrupt termination without cause by City. In no event, shall the City be liable for any loss of profits on the terminated portion of

this Agreement. The rights and remedies of the City provided in this section shall not be exclusive and are in addition to any other rights and remedies provided by law or equity.

# SECTION 13 INDEMNIFICATION, PATENT AND COPYRIGHT INFRINGEMENT

#### 13.1 INDEMNIFICATION

MOTOROLA SHALL DEFEND, INDEMNIFY, AND HOLD CUSTOMER, ITS SUCCESSORS, ASSIGNS, OFFICERS, EMPLOYEES AND ELECTED OFFICIALS HARMLESS FROM AND AGAINST ALL INDEMNIFIED CLAIMS DUE TO, CONCERNING OR RESULTING FROM THE FAULT OF MOTOROLA, OR MOTOROLA'S AGENTS, EMPLOYEES OR SUBCONTRACTORS, IN THE PERFORMANCE OF MOTOROLA'S OBLIGATIONS UNDER THIS AGREEMENT. NOTHING HEREIN SHALL BE DEEMED TO LIMIT THE RIGHTS OF CUSTOMER OR MOTOROLA (INCLUDING, BUT NOT LIMITED TO, THE RIGHT TO SEEK CONTRIBUTION) AGAINST ANY THIRD PARTY WHO MAY BE LIABLE FOR AN INDEMNIFIED CLAIM.

#### 13.1.1 INDEMNIFIED CLAIMS.

"Indemnified Claims" shall include any and all claims, demands, suits, causes of action, judgments and liability of every character, type or description, including all costs and expenses of litigation, mediation or other alternate dispute resolution mechanism, made against the Customer for:

- a. physical damage to or loss of the property of any person (including, but not limited to Customer, Motorola, their respective agents, officers, employees and subcontractors; the officers, agents, and employees of such subcontractors; and third parties); and/or
- death, bodily injury, illness, disease, or loss of services to any person (including but not limited to the agents, officers and employees of Customer, Motorola, Motorola's subcontractors, and third parties),

Not withstanding the City's right to defend itself, where Motorola is defending the City, Motorola agrees that its attorneys will cooperate with the City's attorneys or other representatives and keep them informed as to the progress and status of any litigation and settlement discussions in connection with such litigation. Motorola's attorneys will exclusively handle the litigation, but the City's attorneys, at the City's expense, may attend court proceedings and related meetings, as well as review and comment on documents.

In no instance shall Motorola be responsible for the costs of the City's defense team or Indemnified Claims should the City choose to defend itself.

Should Motorola and the City mutually agree that the City should defend an Indemnified Claim in its own name, then Motorola agrees to retain the City's staff attorneys, mutually agreed outside attorneys, and/or professionals and compensate them for the costs of defending the claim under the direction of Motorola. Motorola will also pay any expenses, losses, and judgments attributable to the Indemnified Claims.

## 13.1.2 FAULT

"Fault" shall include the sale of defective Deliverables, negligence, intentional torts or recklessness, or a breach of any legally imposed strict product liability.

#### 13.2 PATENT AND COPYRIGHT INFRINGEMENT

Motorola agrees to indemnify, defend, and hold harmless Licensee from all claims, losses, and liabilities resulting from any claims or challenges to Motorola's title to the licensed Motorola Software and Equipment and Motorola's rights to sublicense Non-Motorola Software. Motorola will defend and indemnify, and hold harmless at its own expense, any suit brought against the Customer, as Licensee, to the extent that it is based on a claim that the Equipment or Motorola Software infringes a United States patent, copyright or intellectual property right of any third party, and Motorola will pay those costs and the damages awarded against the Customer in any such suit which are attributable to any such claim, but such defense and payments are conditioned on the following: i) Motorola must be notified promptly in writing by Customer of any notice of such written claim; ii) Customer provides Motorola with the necessary cooperation, assistance, and information in order for Motorola to perform its obligations under this Section; and iii) Motorola will have sole control of the defense of such suit and all negotiations for its settlement or compromise provided Motorola keeps Customer updated and advised with regard to all settlements and compromises; and iv) should the Equipment or Motorola Software become, or in Motorola's opinion be likely to become, the subject of a claim of infringement of a United States patent or copyright, Customer will permit Motorola, at its option and expense, after consulting with Customer to i) procure for Customer the right to continue using the Equipment or Motorola Software (as contemplated under this Agreement) from the complaining party; ii) replace the infringing Equipment or Motorola Software with a substantially compatible, non-infringing functional equivalent; or iii) modify the same so that it becomes non-infringing without substantially impairing its functionality or the functionality of all of the Equipment and Software. If Motorola, using reasonable efforts, is unable to accomplish any of the foregoing, Motorola may grant Customer a credit for the Equipment or Motorola Software as depreciated and accept its return. The depreciation amount will be based upon generally accepted accounting standards for such Equipment and Motorola Software. Motorola will have no liability with respect to any claim of patent or copyright infringement which is based upon the combination of the Equipment or Motorola Software furnished hereunder with software, apparatus or devices not furnished by Motorola under this Agreement or otherwise contemplated for use. Motorola shall not have any liability for the use of ancillary equipment or software not furnished by Motorola under this Agreement which is attached to or used in connection with the Equipment or otherwise contemplated for use. The foregoing states the entire liability of Motorola with respect to infringement of patents and copyrights by the Equipment and Motorola Software or any parts thereof.

#### SECTION 14 INSURANCE

#### 14.1 GENERAL REQUIREMENTS

#### 14.1.1 MINIMUM COVERAGE.

Motorola shall at a minimum carry insurance in the types and amounts indicated below for the duration of the Agreement and during any warranty period.

## 14.1.2 CERTIFICATES.

Motorola shall forward Certificates of Insurance with the endorsements required below to the City's Contract Compliance Manager with copies to the City's Project Manger as verification of coverage within 14 calendar days after notification of award, unless otherwise specified.

## 14.1.3 COMMENCEMENT OF WORK.

Motorola shall not commence work until the required insurance is obtained and has been reviewed by City. Approval of insurance by the City shall not relieve or decrease the liability of Motorola hereunder and shall not be construed to be a limitation of liability on the part of Motorola.

## 14.1.4 SUBCONTRACTOR CERTIFICATES.

Motorola must submit certificates of insurance for all Subcontractors to the City prior to them commencing work on the Project.

# 14.1.5 INSURANCE COMPANY REQUIREMENTS.

Motorola's and all Subcontractors' insurance coverage shall be written by companies licensed to do business in the State of Texas at the time the policies are issued and shall be written by companies with AM. Best ratings of B+VII or better. The City will accept workers' compensation coverage written by the Texas Workers' Compensation Insurance Fund.

# 14.1.6 REQUIRED INFORMATION.

All endorsements naming the Customer as additional insured, waivers, and notices of cancellation, endorsements as well as the Certificate of Insurance shall contain solicitation number and the following information:

City of Austin
Purchasing Office
Attn: Urcha Dunbar-Crespo
Contract Compliance Manager
P. 0. Box 1088
Austin, Texas 78767

## 14.1.7 OTHER INSURANCE CLAUSE.

The "other" insurance clause shall not apply to the Customer where the Customer is an additional insured shown on any policy. It is intended that the Owners and Contractor's Liability policy required in the Agreement, covering both Customer and Motorola, shall be considered primary coverage as applicable.

#### 14.1.8 UMBRELLA OR EXCESS LIABILITY

If insurance policies are not written for amounts specified below, Motorola shall carry Umbrella or Excess Liability Insurance for any differences in amounts specified. If Excess Liability Insurance is provided, it shall follow the form of the primary coverage

### 14.1.9 POLICY MODIFICATION.

If the Statement of Work substantially changes, the Customer reserves the right to make reasonable requests for deletion or revision or modification of particular insurance policy terms, conditions, limitations, or exclusions except where policy provisions are established by law or regulations binding upon either of the parties hereto or the underwriter on any such policies. The Customer has

the right to inspect all insurance policies during normal business hours at the company's main offices.

# 14.1.10 MODIFICATION OF REQUIREMENTS.

Customer reserves the right to review requirements set forth during the effective period of this Agreement and to make reasonable adjustments to insurance coverage, limits, and exclusions when deemed necessary and prudent by Customer based upon changes in statutory law, court decisions, or financial condition of Motorola.

## 14.1.11 NO CANCELLATION.

Motorola shall not cause any insurance to be canceled nor permit any insurance to lapse during the term of the Agreement or as required in the Agreement.

## 14.1.12 RESPONSIBILITY FOR PREMIUMS.

Motorola shall be responsible for premiums, deductibles and self-insured retentions, if any, stated in the policies.

#### 14.1.13 ALL-RISK COVERAGE.

If Customer owned property is in the care, custody or control of Motorola, then Motorola shall provide property coverage on an "All Risk of Physical Loss" form. The coverage shall be provided on a replacement cost basis for the 100% value of Customer owned property. If property is being transported or stored off-site by Motorola, then transit and storage coverage shall also be provided. The Customer shall be endorsed onto the policy as a loss payee.

#### 14.1.14 RESPONSIBILITY NOT LIMITED.

The insurance coverages specified below are required minimums and are not intended to limit the responsibility or liability of Motorola.

## 14.2 SPECIFIC REQUIREMENTS

## 14.2.1 WORKER'S COMPENSATION AND EMPLOYER'S LIABILITY INSURANCE.

The Motorola policy shall apply to the State of Texas and coverage shall be consistent with statutory benefits outlined in the Texas Worker's Compensation Act (Art. 8308-1.01 et seq. Tex. Rev. Civ. Stat.). The minimum policy limits for Employer's Liability are \$1,000,000 bodily injury each accident, \$1,000,000 bodily injury by disease policy limit and \$1,000,000 bodily injury by disease each employee and include these endorsements in favor of the City of Austin:

- a. Waiver of Subrogation, Form WC420304
- Thirty (30) days Notice of Cancellation, Form WC 420601

#### 14.2.2 COMMERCIAL GENERAL LIABILITY INSURANCE.

The minimum bodily injury and property damage per occurrence are \$5,000,000 for coverages A and B and the policy shall contain the following provisions and endorsements in favor of the City of Austin and applicable Eligible User:

a. Blanket contractual liability coverage for liability assumed under this Agreement

- and all Contracts related to this project.
- b. Independent Contractor's Coverage.
- c. Products/Completed Operations Liability for the duration of the warranty period.
- d. Explosion, Collapse, and Underground Coverage (X, C, U)
- e. Waiver of Subrogation, Endorsement CG 2404
- f. Thirty (30) days Notice of Cancellation, Endorsement CG 0205
- g. The City of Austin and applicable Eligible User listed as an additional insured, Endorsement CG 2010

## 14.2.3 BUSINESS AUTOMOBILE LIABILITY INSURANCE.

Motorola shall provide coverage for all owned, non-owned and hired vehicles with a minimum, combined single limit of \$5,000,000 per occurrence for bodily injury and property damage and the policy shall include these endorsements in favor of the City of Austin:

- Waiver of Subrogation, Endorsement TE 2046A
- b. Thirty (30) days Notice of Cancellation, Endorsement TE 0202A.
- c. The City of Austin listed as an additional insured, Endorsement TE 9901B.

## 14.2.4 PROFESSIONAL LIABILITY.

Professional Liability coverage, or a statement of self insurance for a minimum limit of \$5,000,000 per claim, to pay on behalf of the insured all sums which the insured shall become legally obligated to pay as damages by reason of its negligent act error, or omission arising out of the performance of professional services under this Agreement and must provide:

- a. If coverage is written on a claims made basis, the retroactive date shall be prior to or coincident with the date of the Agreement and the certificate of insurance shall state that the coverage is claims made and indicate the retroactive date; and
- This coverage shall be continuous and will be provided for 24 months following Phase I Acceptance.

## 14.2.5 OWNERS' And CONTRACTORS' PROTECTIVE LIABILITY POLICY:

Motorola shall provide an Owners' and Contractors' Protective Liability policy in the name of the City and Motorola in accordance with the following:

- a. The policy limits of the policy will be \$5,000,000.
- b. The term of the policy will be for three years.

#### SECTION 15 DISPUTE RESOLUTION

## 15.1 NEGOTIATIONS

If a dispute arises out of or relates to the Agreement, or the breach thereof, the parties agree to negotiate prior to prosecuting a suit for damages. However, this Section does not prohibit the filing of a lawsuit to toll the running of a statute of limitations or to seek injunctive relief. Either party

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may make a written request for a meeting between representatives of each party within fourteen (14) calendar days after receipt of the request or such later period as agreed by the parties. Each party shall include, at a minimum, one (1) senior level individual with decision-making authority regarding the dispute. The purpose of this and any subsequent meeting is to attempt in good faith to negotiate a resolution of the dispute. If, within thirty (30) calendar days after such meeting, the parties have not succeeded in negotiating a resolution of the dispute, they will proceed directly to mediation as described below. Negotiation may be waived by a written agreement signed by both parties, in which event the parties may proceed directly to mediation as described below.

## 15.2 MEDIATION

If the efforts to resolve the dispute through negotiation fail, or the parties waive the negotiation process, the parties may select, within thirty (30) calendar days, a mediator trained in mediation skills to assist with the resolution of the dispute. Should they choose this option, Motorola and Customer agree to act in good faith in the selection of the mediator and to give consideration to qualified individuals nominated to act as mediator. Nothing in the Agreement prevents the parties from relying on the skills of a person who is trained in the subject matter of the dispute or a contract interpretation expert. If the parties fail to agree on a mediator within thirty (30) calendar days of initiation of the mediation process, the mediator shall be selected by the Travis County Dispute Resolution Center (DRC). The parties agree to participate in mediation in good faith for up to thirty (30) calendar days from the date of the first mediation session. Customer and Motorola will share the costs of mediation equally. The mediation will be non-binding.

## SECTION 16 LIMITATION OF LIABILITY

Notwithstanding any other provision to this Agreement, except for personal injury or death, Motorola's total liability, whether for breach of contract, warranty, negligence, strict liability in tort, indemnification, or otherwise, will be limited to the direct damages recoverable under law, but not to exceed the amount equal to the sum of the prices of the following: the price of Phase I Infrastructure and Services, the price of Phase II Services, and the price of the City's User Equipment as stated in Subsections 5.1.2 a., b. and c. For Eligible Users other than the City, Motorola's total liability will be limited to the amount of their Purchase Orders. IN NO EVENT WILL MOTOROLA BE LIABLE FOR ANY LOSS OF USE, LOSS OF TIME, INCONVENIENCE, LOST PROFITS OR SAVINGS, OR OTHER SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES IN ANY WAY RELATED TO OR ARISING FROM THIS AGREEMENT, THE SALE OR USE OF THE EQUIPMENT, OR THE PERFORMANCE OF SERVICES BY MOTOROLA PURSUANT TO THIS AGREEMENT. This Limitation of Liability will survive the expiration or termination of this Agreement.

## SECTION 17 SUBCONTRACTORS

## 17.1 COMPLIANCE PLAN

An MBE/WBE Program Compliance Plan is required by the Solicitation and Motorola has identified Subcontractors, therefore Motorola shall comply with the provisions of Chapter 5-7 of the Austin City Code of 1992, as amended, and the terms of the Compliance Plan as approved by the City (the "Plan"). Motorola shall not initially employ any Subcontractor except as provided in

Motorola's Plan. Motorola shall not substitute any Subcontractor identified in the Plan, unless the substitute has been accepted by City in writing in accordance with the provisions of Chapter 5-7. No acceptance by City of any Subcontractor shall constitute a waiver of any rights or remedies of City with respect to defective deliverables provided by a Subcontractor. If a Plan has been approved, Motorola is additionally required to submit a monthly Subcontract Awards and Expenditures Report to the project manager or contract manager no later than the tenth calendar day of each month.

#### 17.2 SUBCONTRACT

Work performed for Motorola by a Subcontractor shall be pursuant to a written Agreement between Motorola and Subcontractor. The terms of the subcontract may not conflict with the terms of the Agreement, and shall contain provisions that:

- Require that all deliverables to be provided by the subcontractor be provided in strict accordance with the provisions, specifications and terms of the agreement;
- Prohibit the subcontractor from further subcontracting any portion of the agreement without
  the prior written consent of Motorola. City may require, as a condition to such further
  subcontracting, that the subcontractor post a payment bond in form, substance and amount
  acceptable to City;
- c. Require subcontractors to submit all invoices and applications for payments, including any claims for additional payments, damages or otherwise, to Motorola in sufficient time to enable Motorola to include same with its invoice or application for payment to City in accordance with the terms of the agreement;
- d. Require that all subcontractors obtain and maintain, throughout the term of their agreement, worker's compensation and employer's liability insurance, commercial general liability insurance, and business automobile liability with a minimum policy limit of \$1,000,000, with City being a named insured as its interest shall appear.

## 17.3 MOTOROLA RESPONSIBILITIES

Motorola shall be fully responsible to Customer for all acts and omissions of the Subcontractors just as Motorola is responsible for Motorola's own acts and omissions, including indemnification. Nothing in the Agreement shall create for the benefit of any such Subcontractor any contractual relationship between Customer and any such Subcontractor, nor shall it create any obligation on the part of Customer to pay or to see to the payment of any moneys due any such Subcontractor except as may otherwise be required by law.

### 17.4 PAYMENT

Motorola shall pay each Subcontractor its appropriate share of payments made to Motorola not later than ten days after receipt of payment from Customer.

## SECTION 18 REPORTING AND PROGRESS REPORTS

#### 18.1 WEEKLY BRIEFINGS

The Motorola Project Manager shall keep the Customer informed of Project developments and shall report weekly to the Customer Project Manager. The Motorola Project Manager shall provide briefings and Project Updates to the Customer when the Customer requests such briefings and Project Updates. The Motorola Project Manager agrees to participate in the Customer's System project management meetings as required by the Customer.

#### 18.2 MONTHLY REPORTS

Motorola shall submit a written Progress Report of the Project to the Customer Project Manager with copy to the City of Austin Purchasing Office, Attn: Contract Compliance Manager, City Purchasing Officer, City of Austin, by the fifth business day of each month. The format and content of the report shall be mutually agreed on during the Detailed Design Review described in the Exhibit B-1 (SOW) however, this report shall at a minimum include: Equipment delivered, Services provided and milestones completed during the previous month; work planned; open issues; and Project Schedule status.

#### SECTION 19 OTHER AGREEMENTS

## 19.1 TITLE AND RISK OF LOSS

Title to the Equipment will pass to Customer upon delivery to the Customer's designated sites. Customer shall have the right to inspect and inventory the Equipment. Risk of loss for the Equipment will pass to Customer only upon installation at Customer's designated sites, on a site-by-site basis. For mobiles, portables, control stations, and accessories, risk of loss will pass to Customer upon delivery to Customer. Title to Software will not pass to Customer at any time.

#### 19.2 INDEPENDENT CONTRACTOR

This Agreement shall, not be construed as creating an employer/employee relationship, a partnership, or a joint venture. Motorola's services shall be those of an independent contractor. Motorola agrees and understands that the Agreement does not grant any rights or privileges established for employees of the City.

#### 19.3 WORKFORCE

Motorola shall employ only orderly and competent workers, skilled in the performance of the services they will perform under this Agreement. Motorola, its employees, subcontractors, and subcontractor's employees may not use or possess any firearms, alcoholic or other intoxicating beverages, illegal drugs or controlled substances while on the job or on Customer's property, nor may such workers be intoxicated, or under the influence of alcohol or drugs, on the job. If Customer or Customer's representative notifies Motorola that any worker is incompetent, disorderly or disobedient, has knowingly or repeatedly violated safety regulations, has possessed any firearms, or has possessed or was under the influence of alcohol or drugs on the job, Motorola shall immediately remove that worker from performing services hereunder, and may not employ such worker again hereunder without Customer's prior written consent.

#### 19.4 RIGHT TO AUDIT

Motorola agrees that the representatives of the office of the City Auditor or other authorized representatives of Customer shall have access to, and the right to audit, examine, or reproduce, any and all records of Motorola related to the performance under this Agreement, provided that the Customer's right to audit such books and records are limited to the verification of invoice quantities to shipments and shipment receipts, upon advance notice and during normal business hours. In no event will Customer have right to inspect records or facilities of Motorola or its subcontractors which are deemed confidential or proprietary, including but not limited to data relating to Motorola's costs. Any such audits or inspections shall be at the Customer's expense. Motorola shall retain all such records for a period of three (3) years after final payment on this Agreement or until all audit public information requests and litigation matters that Customer has brought to the attention of Motorola are resolved, whichever is longer or as required by law. Motorola agrees to refund to Customer any overpayments disclosed by any such audit. Motorola shall include the foregoing provision in all Subcontractor agreements entered into in connection with this Agreement.

#### 19.5 RIGHT TO ASSURANCE

Whenever one party to this Agreement in good faith has reason to question the other party's intent to perform, demand may be made to the other party of written assurance of the intent to perform. In the event that no assurance is given within the time specified after demand is made, the demanding party may treat this failure as an Event of Default.

## 19.6 STOP WORK NOTICE

Customer may issue an immediate Stop Work Notice in the event Motorola is observed performing in a manner that is in violation of Federal, State or local guidelines, or in a manner that is determined by Customer to be unsafe to either life or property. Upon notification, Customer will cease all work until notified by customer that the violation or unsafe condition has been corrected. Motorola will be liable for all costs incurred by Customer as a result of the issuance of the Stop Work Notice.

#### 19.7 CLAIMS

If any claim, demand, suit, or other action is asserted against Motorola which arises under or concerns this Agreement, or which could have a material adverse affect on Motorola's ability to perform hereunder, Motorola shall give written notice thereof to Customer within ten days after receipt of notice by Motorola. Such notice to Customer shall state the date of notification of any such claim, demand, suit, or other action; the names and addresses of the claimant(s); the basis thereof, and the name of each person against whom such claim is being asserted. Such notice shall be delivered personally or by mail and shall be sent to Customer and to the Austin City Attorney. Personal delivery to the City Attorney shall be to Norwood Tower, 114 West 7th Street, 5th floor, Austin, Texas 78701, and mail delivery shall be to P.O. Box 1088, Austin, Texas 78767.

## 19.8. FINAL PAYMENT

The making and acceptance of final Payment will constitute:

a. A waiver of all claims by Customer against Motorola, except claims (a) which have been previously asserted in writing and not yet settled, (b) arising from defective work appearing after final inspection, (c) arising from failure of Motorola to comply with the Agreement or the terms of any warranty specified herein, (d) arising from Motorola continuing obligations

- under the Agreement, including but not limited to indemnity and warranty obligations, or (e) arising under Customer's right to audit; and
- b. A waiver of all claims by Motorola against Customer other than those previously asserted in writing and not yet settled and except any claims or counterclaims arising as a result of action taken by Customer as to the excepted claims referenced in the preceding paragraph.

#### 19.9 ADVERTISING

Motorola shall not advertise or publish, without Customer's prior consent, the fact that Customer has entered into the Agreement, except to the extent required by law.

#### 19.10 NO CONTINGENT FEES

Motorola warrants that no person or selling agency has been employed or retained to solicit or secure the Agreement upon any agreement or understanding for commission, percentage, brokerage, or contingent fee, excepting bona fide employees of bona fide established commercial or selling agencies maintained by Motorola for the purpose of securing business. For breach or violation of this warranty, Customer shall have the right, in addition to any other remedy available, to cancel the Agreement without liability and to deduct from any amounts owed to Motorola, or otherwise recover, the full amount of such commission, percentage, brokerage or contingent fee.

#### 19.11 GRATUITIES

Customer may, by written notice to Motorola, cancel the Agreement without liability if it is determined by Customer that gratuities were offered or given by Motorola or any agent or representative of Motorola to any officer or employee of the City of Austin with a view toward securing the Agreement or securing favorable treatment with respect to the awarding or amending or the making of any determinations with respect to the performing of such Agreement. In the event the Agreement is canceled by Customer pursuant to this provision, Customer shall be entitled, in addition to any other rights and remedies, to recover or withhold the amount of the cost incurred by Motorola in providing such gratuities.

#### 19.12 PROHIBITION AGAINST PERSONAL INTEREST IN AGREEMENT

No officer, employee, independent Consultant, or elected official of Customer who is involved in the development, evaluation, or decision-making process of the performance of the solicitation resulting in this Agreement shall, have a financial interest, direct or indirect, in the Agreement. Any willful violation of this section shall, constitute impropriety in office, and any officer or employee guilty thereof shall be subject to disciplinary action up to and including DISMISSAL. ANY VIOLATION OF THIS PROVISION, WITH THE KNOWLEDGE, EXPRESSED OR IMPLIED, OF MOTOROLA SHALL, RENDER THE AGREEMENT VOIDABLE BY CUSTOMER.

#### 19.13 FRAUD

Fraudulent statements by Motorola resulting in this Agreement shall be grounds for the termination of the Agreement for cause by Customer and may result in legal action.

## 19.14 SHIPMENT UNDER RESERVATION PROHIBITED

Motorola is not authorized to ship the Deliverables under a reservation and no tender of a bill of lading will operate as a tender of Deliverables.

## 19.15 DELIVERY TERMS AND TRANSPORTATION CHARGES

ALL DELIVERIES WILL BE MADE IN ACCORDANCE WITH THE TERMS OF THE AGREEMENT AS TO TIME OF DELIVERY, QUALITY AND QUANTITY. THE EQUIPMENT WILL BE SHIPPED F.O.B. POINT OF DELIVERY. MOTOROLA'S PRICE INCLUDES ALL DELIVERY AND TRANSPORTATION CHARGES. THE PLACE OF DELIVERY FOR MOBILE, PORTABLE, AND CONTROL STATION EQUIPMENT SHALL BE SET FORTH IN THE PURCHASE ORDER.

#### 19.16 MOTOROLA TO PACKAGE DELIVERABLES

Motorola will package Deliverables in accordance with good commercial practice. Unless otherwise provided in the Statement of Work, each shipping container shall be clearly and permanently marked as follows: (a) Motorola's name and address, (b) Customer's name, address and purchase order or purchase release number and the price agreement number if applicable, (c) Container number and total number of containers, e.g. box 1 of 4 boxes, and (d) the number of the container bearing the packing slip. Motorola shall bear cost of packaging. Deliverables shall be suitably packed to conform with requirements of common carriers and any applicable specifications. Customer's count or weight shall be final and conclusive on shipments not accompanied by packing lists.

# 19.17 RIGHT OF INSPECTION AND REJECTION

Customer expressly reserves all rights under law, including, but not limited to the Uniform Commercial Code, to inspect the Deliverables at delivery before accepting them, and to reject defective or non-conforming Deliverables. If Customer has the right to inspect Motorola's, or Motorola's Subcontractor's, facilities, or the Deliverables at Motorola's, or Motorola's Subcontractor's, premises, Motorola shall furnish, or cause to be furnished, without additional charge, all reasonable facilities and assistance to Customer to facilitate such inspection.

### 19.18 COMPLIANCE WITH SAFETY REGULATIONS

Motorola, its Subcontractors, and their respective employees, shall comply fully with all applicable federal, state, and local safety and health laws, ordinances, rules and regulations in the performance of the Services.

#### 19.19 IN ARREARS FOR TAXES.

Notice is hereby given of Article VIII, Section 1 of the Austin City Charter which prohibits the payment of any money to any person, firm or corporation who is in arrears to the City for taxes, and of §5-1-2 of the Austin City Code of 1992, as amended, concerning the right of the City to offset indebtedness owed the City.

#### 19.20 TRAVEL

All travel and lodging expenses in connection with Services after the Warranty Period for which reimbursement may be claimed by Motorola under the terms of the Agreement will be reviewed against the Current Runzheimer Meal-Lodging Index (the "Index") and the City's Travel Policy. No amounts in excess of the Index and the City's Travel Policy shall be paid. All invoices must be accompanied by copies of receipts (e.g. hotel bills, airline tickets). No reimbursement will be made for expenses not actually incurred. Airline fares in excess of coach or economy will not be reimbursed. Mileage charges may not exceed the amount permitted as a deduction in any year under the Internal Revenue Code or Regulations.

## 19.21 WARRANTY-PRICE

Motorola certifies that the prices in the Offer have been arrived at independently without consultation, communication, or agreement for the purpose of restricting competition, as to any matter relating to such fees with any other firm or with any competitor.

#### 19.22 ACCEPTANCE OF INCOMPLETE OR NON-CONFORMING DELIVERABLES

If, instead of requiring immediate correction or removal and replacement of defective or non-conforming deliverables, Customer prefers to accept it, Customer may do so. Such acceptance will only be effective if Customer and Motorola agree on the amount of diminution in value to be paid Customer and Motorola consents to such acceptance. If the parties cannot reach agreement, then they must comply with the other contractual provisions regarding defective or non-conforming deliverables Motorola shall pay all claims, costs, losses and damages attributable to Customer's evaluation of and determination to accept such defective or non-conforming deliverables. If any such acceptance occurs prior to final payment, Customer may deduct such amounts as are necessary to compensate Customer for the diminished value of the defective or non-conforming Deliverables. If the acceptance occurs after final payment, such amount will be refunded to Customer by Motorola.

# 19.23 RIGHTS TO BID, PROPOSAL AND CONTRACTUAL MATERIAL

All material submitted by Motorola to Customer, except for any of Motorola's intellectual property rights or other proprietary materials, shall become property of Customer upon receipt. Any portions of such material claimed by Motorola to be proprietary must be clearly marked as such. Determination of the public nature of the material is subject to the Open Records Act, Chapter 552, Texas Government Code.

## 19.24 BONDS

#### 19.24.1 PAYMENT BOND

Motorola shall furnish a Payment Bond fully executed in the amount representing one hundred percent (100%) of the Phase I Infrastructure and Services amount, upon ten (10) days notification of awards to cover payment to their subcontractors.

Such bond shall be subject to approval of the, City. The bond will be valid for twenty-four months from the date of the Agreement or until Phase I System Acceptance by the City, whichever is latest.

## 19.24.2 PERFORMANCE BOND

Motorola shall furnish a Performance Bond fully executed in the amount representing one hundred percent (100%) of the Phase I Infrastructure and Services amount, upon ten (10) days notification of award. In the event the Agreement is terminated by default, Motorola shall be liable for the costs as stated in Section 12.3 herein.

Such bond shall be subject to approval of the, City. The bond will be valid for twenty-four months from the date of the Agreement or until Phase I System Acceptance by the City, whichever is latest.

## 19.25 HOLIDAYS. THE FOLLOWING HOLIDAYS ARE OBSERVED BY THE CITY:

Holiday	Date Observed
New Year's Day	January 1
Martin Luther King, Jr.'s Birthday	Third Monday in January
President's Day	Third Monday in February
Memorial Day	Last Monday in May
Independence Day	July 4
Labor Day	First Monday in September
Veteran's Day	November 11
Thanksgiving Day	Fourth Thursday in November
Friday after Thanksgiving	Friday after Thanksgiving
Christmas Eve	December 24
Christmas Day	December 25

If a Legal Holiday falls on Saturday, it will be observed on the preceding Friday. If a Legal Holiday falls on Sunday, it will be observed on the following Monday. Christmas Eve is observed only if it falls on a Monday through Thursday. If Christmas Eve falls on a Friday, that day is observed as the Christmas Day holiday.

#### SECTION 20 GENERAL

#### 20.1 TAXES

Purchases of Deliverables for City use are usually exempt from City, State, and most Federal Taxes. Prices should not include exempted taxes. A Tax Exemption Certificate will be provided to Motorola upon request from the Purchasing Office. Under no circumstances shall the City be liable to pay exempt taxes under this Agreement.

## 20.2 CONFIDENTIAL/PROPRIETARY INFORMATION

All material submitted to the City becomes public property and is subject to the Texas Open Records Act upon receipt. If Motorola does not desire proprietary information to be disclosed, each page must be identified and marked proprietary at time of submittal. The City will, to the extent allowed by law, endeavor to protect such information from disclosure. The final decision as to what information must be disclosed, however, lies with the Texas Attorney General. If the Motorola fails to identify proprietary information, it agrees that by submission of the information that the material shall be deemed non-proprietary and available upon public request.

Customer will not disclose any material or information identified as Motorola proprietary and confidential to third parties without Motorola's prior written permission, unless Motorola makes such material or information public or disclosure is required by law. If Customer is required by law to disclose such material or information, Customer will notify Motorola prior to such disclosure. In order to provide the Deliverables to the Customer, Motorola may require access to certain of Customer's and/or its licensors' confidential information (including inventions, employee information, trade secrets, confidential know-how, confidential business information, and other information which Customer or its licensors consider confidential) (collectively, "Confidential Information").

Each party acknowledges and agrees that the Confidential Information is the valuable property of the other party and/or its licensors and any unauthorized use, disclosure, dissemination, or other release of the Confidential Information will substantially injure the other party and/or its licensors. Each party (including its employees, subcontractors, agents, or representatives) agrees that it will maintain the Confidential Information in strict confidence and shall not disclose, disseminate, copy, divulge, recreate, or otherwise use the Confidential Information without the prior written consent of the other party or in a manner not expressly permitted under this Agreement, unless the Confidential Information is required to be disclosed by law or an order of any court or other governmental authority with proper jurisdiction; provided each party promptly notifies the other party before disclosing such information so as to permit the other party reasonable time to seek an appropriate protective order. Each party agrees to use protective measures no less stringent than that party uses within its own business to protect its own most valuable information, which protective measures shall under all circumstances be at least reasonable measures to ensure the continued confidentiality of the Confidential Information.

#### 20.3 DISCLAIMER OF LICENSE

Except as explicitly provided in the Motorola Software License Agreement included in Exhibit A, nothing in this Agreement will be deemed to grant, either directly or by implication, or otherwise, any license or right under any patents, patent applications, copyrights, trade marks, trade secrets or other intellectual property of Motorola.

## 20.4 ASSIGNABILITY

The Agreement shall be binding upon and inure to the benefit of Customer and Motorola and their respective successors and assigns; provided, however, that no right or interest in the Agreement shall be assigned and no obligation shall be delegated by Motorola without the prior written consent of Customer. Such consent will not be unreasonably withheld. Any attempted assignment or delegation by Motorola shall be void unless made in conformity with this paragraph. The Agreement is not intended to confer rights or benefits on any person, firm or entity not a party hereto; it being the intention of the parties that there be no third party beneficiaries to the Agreement. Subcontracts will be entered into in accordance with the terms of this Agreement. Notwithstanding the foregoing, Motorola may assign its right to receive payments due to Motorola hereunder with the consent of Customer. Customer will not be bound by any such assignment until written notice thereof has been delivered to Customer.

#### 20.5 MODIFICATION

This Agreement can be modified or amended only by written agreement signed by both parties. No preprinted or similar terms on any Motorola invoice, order or other document shall have any force or effect to change the terms, covenants, and conditions of this Agreement.

#### 20.6 WAIVER

Failure or delay by either party to exercise any right or power under this Agreement will not operate as a waiver of such right or power. No claim or right arising out of a breach of the Agreement can be discharged in whole or in part by a waiver or renunciation of the claim or right unless the waiver or renunciation is supported by consideration and is in writing signed by the aggrieved party. No waiver by either Motorola or Customer of any one or more events of default by the other party shall operate as, or be construed to be, a permanent waiver of any rights or obligations under the Agreement, or an express or implied acceptance of any other existing or future default or defaults, whether of a similar or different character.

## 20.7 SURVIVAL OF OBLIGATIONS

All provisions of this Agreement that impose continuing obligations on the parties, including but not limited to the warranty, indemnity, and confidentiality obligations of the parties, shall survive the expiration or termination of this Agreement.

## 20.8 AGREEMENT DRAFTED BY PARTIES

This Agreement is the result of negotiations between the parties. Accordingly, this Agreement shall be considered to be drafted by both parties and any ambiguities in the Agreement shall not be construed against either party.

## 20.9 CONSTRUCTION OF WORDS

Where the context so indicates, a word in the singular form shall include the plural, a word in the masculine form shall include the feminine, and vice-versa.

## 20.10 CAPITALIZED TERMS

Any capitalized terms not defined in the Exhibits will have the meaning as set forth in this Agreement.

## 20.11 PROJECT MANAGEMENT AND ADMINISTRATION

Responsibility for project management and contract administration for this Agreement shall be as follows:

For the City: For Motorola:

Project Management: Project Management

Trunked Radio Project Manager

Attn: Robert Turner

City of Austin RDMT Office 3600 Manor Road Building 2048

Austin, Texas 78723

Contract Administration

Finance and Administrative Services Attn: Urcha Dunbar-Crespo

Contract Compliance Manager P. O. Box 1088

Austin, Texas 78767-8828

Project Director Attn: Pam Faver 7700 West Parmer Lane

PL 34

Austin, Texas 78729

Contract Administration

Motorola, Inc.

Contracts and Compliance 9980 Carroll Canyon Road San Diego, California 92131

#### 20.12 SEVERABILITY

The invalidity, illegality, or unenforceability of any provision of the Agreement shall in no way affect the validity or enforceability of any other portion or provision of the Agreement. Any void provision shall be deemed severed from the Agreement and the balance of the Agreement shall be construed and enforced as if the Agreement did not contain the particular portion or provision held to be void. The parties further agree to reform the Agreement to replace any stricken provision with a valid provision that comes as close as possible to the intent of the stricken provision. The provisions of this section shall not prevent this entire Agreement from being void should a provision, which is the essence of the Agreement, be determined to be void.

## 20.13 HEADINGS AND SECTION REFERENCES

The headings given to the sections of this Agreement are inserted only for reference purposes and are not to be considered in construing this Agreement or as a limitation of the scope of the particular Section to which the heading refers.

## 20.14 ENTIRE AGREEMENT

This Agreement (including the Exhibits) constitutes the entire agreement of the parties regarding the subject matter of this Agreement and supersedes all prior and contemporaneous agreements and understandings, whether written or oral, relating to such subject matter. This Agreement may be altered, amended, or modified only by a written instrument signed by the duly authorized representatives of both parties.

#### 20.15 INTERPRETATION

The Agreement is intended by the parties as a final, complete and exclusive statement of the terms of their agreement. No course of prior dealing between the parties or course of performance or usage of the trade shall be relevant to supplement or explain any term used in the Agreement-Although the Agreement may have been substantially drafted by one party, it is the intent of the parties that all provisions be construed in a manner to be fair to both parties, reading no provisions

more strictly against one party or the other. Whenever a term defined by the Uniform Commercial Code, as enacted by the State of Texas, is used in the Agreement, the UCC definition shall control, unless otherwise defined in the Agreement.

# 20.16 JURISDICTION AND VENUE

This Agreement is made under and shall be governed by the laws of the State of Texas, including, when applicable, the Uniform Commercial Code as adopted in Texas, V.T.C.A. Bus. & Comm. Code, Chapter 1, excluding any rule or principle that would refer to and apply the substantive law of another state or jurisdiction. All issues arising from this Agreement shall be resolved in the courts of Travis County, Texas and the parties agree to submit to the exclusive jurisdiction of such courts. The foregoing, however, shall not be construed or interpreted to limit or restrict the right or ability of Customer to seek and secure injunctive relief from any competent authority as contemplated herein.

## 20.17 NOTICES

All notices, requests, or other communications required or appropriate to be given under the Agreement shall be in writing and shall be deemed delivered three business days after postmarked if sent by U.S. Postal Service Certified or Registered Mail, Return Receipt Requested. Notices delivered by other means shall be deemed delivered upon receipt by the addressee. Routine communications may be made by first class mail, telefax, or other commercially accepted means. Notices to the Customer and Motorola shall be addressed as follows:

## To the City:

City of Austin
Purchasing Office
Attn: Contract Compliance Manager
P.O. Box 1088
Austin, Texas 78767-8828

with a copy to: City Attorney City of Austin P.O. Box 1546 Austin, Texas 78767-1546

## To Motorola:

Motorola, Inc. Project Director Attn: Pam Faver 7700 West Parmer Lane PL 34 Austin, Texas 78729

with a copy to: Motorola, Inc. Contracts and Compliance 9980 Carroll Canyon Road San Diego, California 92131 or at such other address, and to the attention of such other person or officer as either person may designate in writing.

In witness whereof, the parties have caused duly authorized representatives to execute this Agreement on the dates set forth below.

MOTOROLA, INC.

Signature

Name:

Printed Name

Title Gensen Mer. AND VICE PRESIDE

Date: December 26, 2000

REVIEWED AND APPROVED AS TO FORM

Scott Dodge 12.26-00

MOTOROLA
CONTRACTS AND COMPLIANCE DEPT.

CITY OF AUSTIN

By: Signature

Name; S

Printed Name

Title: Poschas

ate District

APPROVED AS TO FORM:

City of Austin Law Department

Date: 12/27/00

# List of Agreement Exhibits

Exhibit A Motorola Software License Agreement ("Software License Agreement")

Attachment 1 Motorola Software

Attachment 2 Non-Motorola Software

Exhibit B Technical Exhibits

Exhibit B-1 Statement of Work ("Statement of Work" or "SOW"), dated November 28, 2000

Appendix A Work Breakdown Structure dated November 11, 2000

Appendix B Project Schedule dated November 26, 2000

Appendix C Change Order Form

Appendix D General Circuit Descriptions and Specifications

Exhibit B-2 Acceptance Test Plan ("Acceptance Test Plan "or "ATP"), dated November 28, 2000

Exhibit B-3 System Description ("System Description"), dated November 28, 2000

Exhibit B-4 Equipment List ("Equipment List")

Exhibit C Enhanced System Support Statement of Work ("ESS Plan")

Exhibit D Maintenance and Support Agreements

Exhibit D-1 Motorola Service Agreement ("Service Agreement")

Exhibit D-2 Software Subscription Agreement ("Subscription Agreement")

Appendix A System Options, Term, and Fees

Exhibit E Payment and Pricing Agreement ("Pricing Agreement"), 12/26/00

Exhibit F Motorola Proposal dated 08/16/99 ("Motorola Proposal")

Exhibit G City of Austin Request for Proposal, No. VC 98300024, issued 06/22/98 and all amendments thereto ("RFP")

Exhibit H 800 MHz Trunked Voice Radio System Implementation Interlocal Agreement ("Interlocal Agreement")

# **Exhibit A**

# Software License Agreement 911 RDMT Radio Project

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#### **EXHIBIT A**

## SOFTWARE LICENSE AGREEMENT

This Software License Agreement ("Agreement") is entered into effective on the date of the last signature below ("Effective Date") between Motorola, Inc., a Delaware corporation ("Motorola"), and the City of Austin, a Texas home-rule municipal corporation ("Licensee")

WHEREAS, Licensee is acquiring a 800 MHz trunked radio communications system, ("System") software, and products from Motorola that include software owned or licensed by Motorola;

WHEREAS, Licensee desires to obtain a personal, non-exclusive right and license to use such software and documentation for Licensee's radio communication system and Motorola is willing to grant such a license on the terms of this Agreement;

**NOW THEREFORE**, in consideration for the mutual promises and covenants contained in this Agreement, the parties agree as follows:

## Section 1 SCOPE

Licensee may acquire from Motorola's Commercial, Government, and Industrial Solutions Sector ("CGISS") radio communication products ("Products") that contain embedded or pre-loaded Motorola software such as in a ROM, PROM, or EPROM, or other Motorola software provided on media such as a floppy disk, tape, diskette, or CD-ROM. All such software (including Radio Service Software and FLASHport® Software) is referred to as "Motorola Software." and listed in Attachment "1" to this Agreement and by reference incorporated in it. In addition, Motorola agrees to provide third party software ("Non-Motorola Sub-Licensed Software") which Motorola does not own but is licensed to distribute as listed in Attachment "2" to this Exhibit A and by reference incorporated in it. The terms of this Agreement apply to Licensee's use of Motorola Software and Non-Motorola Sub-Licensed Software (collectively "Software"). In addition to providing the most current version of Software, Motorola agrees to provide Licensee with all user/operation manuals and other information describing the Software and its technical features and performance features, including all physical media upon which the information is provided ("Documentation").

## Section 2 GRANT OF LICENSE

Motorola hereby grants to Licensee a personal, non-exclusive, perpetual license under all of Motorola's applicable proprietary rights to use Software including any new upgrades, new releases, or revisions of the Software released by Motorola to the Licensee and Documentation in accordance with the terms of this Agreement and the Software Subscription Agreement (SSA) (after the ESS Period, as defined in the Communications Systems Agreement, the SSA will apply only if purchased by Licensee for additional periods). For purpose of this Agreement, any use, rights granted to Licensee hereunder, will also be extended to Eligible Users, including Travis County, as defined in the Communications Systems Agreement who have issued Purchase Orders in accordance with the terms of the Communications System Agreement for Equipment.

#### Section 3 LIMITATIONS ON USE

Licensee, its employees, and its authorized agents may use the Software for the 800 Mhz radio communications system purchased from Motorola as fully described in the Communications Systems Agreement and only as described in the Software or Product Documentation. Any other use of the Software is strictly prohibited and will be deemed a breach of this Agreement. Licensee

may not copy, modify, adapt, merge with other software, reverse engineer, prepare derivative works of, or disassemble any Software for any reason, except that Licensee may make at most two copies of the Software provided with infrastructure equipment and Products for back-up and archival purposes. Licensee must purchase a copy of Radio Service Software for each site at which Licensee uses Radio Service Software; and Licensee may make one additional copy of the said Radio Service Software for each computer owned or controlled by Licensee at each such site. Licensee may use and install Radio Service Software on portable or laptop computers as required by Licensee, at other sites. Prior to acquiring any Radio Service Software or upon Motorola's written request, Licensee must provide a written list of all sites where Licensee uses or intends to use Radio Service Software. Licensee must reproduce all copyright and trademark notices of the owners thereof on all copies of the Software and Documentation.

#### Section 4 TRANSFERS

If Licensee transfers ownership of the System to a third party, Licensee may assign its rights to use the Software (other than Radio Service Software and FLASHport® Software) embedded in or furnished for use with the System provided that (a) Licensee transfers all copies of such Software to the new owner and (b) Motorola receives a transfer form (which Motorola will provide upon request) completed and signed by the new owner. Otherwise, Licensee may not transfer or make available any Software to any third party.

### Section 5 OWNERSHIP AND TITLE

Title to all copies of Motorola Software in any form, including all rights in patents, copyrights, trade secrets, and other intellectual properties, remains vested exclusively in Motorola.

#### Section 6 CONFIDENTIALITY

Licensee acknowledges that all Software contains valuable proprietary information and trade secrets and that unauthorized dissemination, distribution, modification, reverse engineering, disassembly, or other improper use of the Software is prohibited under this Agreement. To the extent authorized by law, Licensee will limit access to the Software to those of its employees and authorized agents who need to use the Software for Licensee's radio communications system, and Licensee will take appropriate action with those employees and agents to preserve the confidentiality of the Software.

#### Section 7 WARRANTIES

- A. Warranty of Ownership. Motorola warrants to Licensee that it is the owner or proper licensee of the Software and Documentation and that Motorola has the right to enter into this Agreement and grant all licensees herein.
- B. Software and Documentation Warranty. During the Warranty Period as defined in the Communications Systems Agreement, Motorola warrants that the Software, when used properly, will be free from reproducible defects that eliminate the functionality or successful operation of a feature critical to the primary functionality or successful operation of the System. The primary functionality of a voice communication system is reliable subscriber-to-subscriber, subscriber-to-dispatcher, and dispatcher-to-subscriber voice communication as described in the System Description (Exhibit B-3 to the Communication System Agreement). The successful operation of a data system is point-to-point data transmission. Motorola does not warrant that Licensee's use of the Software or Products will be uninterrupted or error-free or that the Software or the Products will meet Licensee's requirements other than those stated in the Communications System Agreement, for the System, including Exhibits. This software warranty does not include

any warranty covering the processing of date data from, into, and between the year 1999 and the year 2000. Any such warranty would be provided as set forth in Section 7 C. of this Agreement.

MOTOROLA'S TOTAL LIABILITY, AND LICENSEE'S SOLE REMEDY, FOR ANY BREACH OF THE SOFTWARE AND DOCUMENTATION WARRANTY OF SECTION 7B. WILL BE LIMITED TO, AT MOTOROLA'S OPTION, REPAIR THE SOFTWARE TO CONFORM TO SOFTWARE SPECIFICATIONS OR REPLACEMENT OF THE SOFTWARE WITH SOFTWARE OF FUNCTIONAL EQUIVALENCE OR PAYMENT OF LICENSEE'S DIRECT DAMAGES RECOVERABLE UNDER LAW, BUT NOT TO EXCEED THE AMOUNT EQUAL TO THE SUM OF THE PRICES OF THE FOLLOWING: THE PRICE OF PHASE I, THE PRICE OF PHASE II, AND THE PRICE OF THE CITY'S USER EQUIPMENT. FOR ELIGIBLE USERS OTHER THAN THE CITY, MOTOROLA'S TOTAL LIABILITY WILL BE LIMITED TO THE AMOUNT OF THEIR PURCHASE ORDERS. THIS WARRANTY EXTENDS ONLY TO THE FIRST LICENSEE; SUBSEQUENT TRANSFEREES MUST ACCEPT THE MOTOROLA SOFTWARE "AS IS" AND WITH NO WARRANTIES OF ANY KIND. MOTOROLA DISCLAIMS ALL IMPLIED WARRANTIES OR CONDITIONS, INCLUDING THE IMPLIED WARRANTIES OR CONDITIONS OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

- C. Year 2000 Express Warranty. The Year 2000 Express Warranty is defined as set forth in the Communications Systems Agreement for the System.
- D. Patent and Copyright Infringement. Patent and Copyright Infringement is defined as set forth in the Communications Systems Agreement for the System.

## Section 8 LIMITATION OF LIABILITY

IN NO EVENT WILL MOTOROLA BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES OF THE LICENSEE EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

## Section 9 TERM AND TERMINATION

Licensee's right to use Software will begin when Licensee sends a duly executed copy of this Agreement to Motorola, and either (a) Motorola returns a fully executed Agreement to Licensee or (b) Licensee receives the Motorola shipped Software, and accompanying Documentation or a Product containing Motorola Software to Licensee, and will continue in perpetuity unless terminated as follows. Motorola shall give written Notice to Licensee of any default of this Agreement by Licensee. Licensee will have thirty (30) calendar days from receipt of such Notice to cure said default or to provide a plan of action that is acceptable to Motorola to cure the default. If Licensee fails to cure said default, Motorola shall have the right to terminate under this Agreement. In addition, if Licensee is in default of this Agreement with respect to Radio Service Software or FLASHport® Software, Motorola shall give written Notice to Licensee of any default of this Agreement by Licensee. Licensee will have seven (7) calendar days from receipt of such Notice to cure said default or to provide a plan of action that is acceptable to Motorola to cure the default. If Licensee fails to cure said default, Motorola shall have the right to terminate under this Agreement.

Upon termination, Motorola will have the right to repossess all RSS and FLASHport® Software in Licensee's possession. Within thirty (30) days after termination of Licensee's right to use any Software or Product, Licensee must certify in writing to Motorola that all copies of such Software or Product have been returned to Motorola or destroyed.

## Section 10 NOTICES

All notices, requests, or other communications required or appropriate to be given under the Agreement shall be in writing and shall be deemed delivered three business days after postmarked if sent by U.S. Postal Service Certified or Registered Mail, Return Receipt Requested. Notices delivered by other means shall be deemed delivered upon receipt by the addressee. Routine communications may be made by first class mail, telefax, or other commercially accepted means. Notices to the Licensee and Motorola shall be addressed as follows:

# To the City:

City of Austin
Purchasing Office
Attn: Contract Compliance Manager
P.O. Box 1088
Austin, Texas 78767-8828

with a copy to: City Attorney City of Austin P.O. Box 1546 Austin, Texas 78767-1546

### To Motorola:

Motorola, Inc. Contracts and Compliance 9980 Carroll Canyon Road San Diego, California 92131

or at such other address, and to the attention of such other person or officer as either person may designate in writing.

#### Section 11 GENERAL

- A. COPYRIGHT NOTICES. The existence of a copyright notice on Software will not be construed as an admission or presumption that public disclosure of Software or any trade secrets associated with Software has occurred.
- B. SEVERABILITY. The invalidity, illegality, or unenforceability of any provision of this Agreement shall in no way affect the validity or enforceability of any other portion or provision of the Agreement. Any void provision shall be deemed severed from the Agreement and the balance of the Agreement shall be construed and enforced as if the Agreement did not contain the particular portion or provision held to be void. The parties further agree to reform the Agreement to replace any stricken provision with a valid provision that comes as close as possible to the intent of the stricken provision. The provisions of this section shall not prevent this entire Agreement from being void should a provision, which is the essence of the Agreement, be determined to be void.

- C. WAIVERS. No waiver of a right or remedy of a party will constitute a waiver of another right or remedy of that party.
- D. ASSIGNMENTS. The Agreement shall be binding upon and inure to the benefit of Licensee and Motorola and their respective successors and assigns; provided, however, that no right or interest in the Agreement shall be assigned and no obligation shall be delegated by Motorola without the prior written consent of Licensee. Such consent will not be unreasonably withheld. Any attempted assignment or delegation by Motorola shall be void unless made in conformity with this paragraph. The Agreement is not intended to confer rights or benefits on any person, firm or entity not a party hereto; it being the intention of the parties that there be no third party beneficiaries to the Agreement except for the Eligible Users.
- E. ENTIRE AGREEMENT AND AMENDMENT. This Agreement contains the parties' entire agreement regarding Licensee's use of Software and Documentation and may be amended only in a writing signed by both parties.
- F. JURISDICTION AND VENUE. The Agreement is made under and shall be governed by the laws of the State of Texas, including, when applicable, the Uniform Commercial Code as adopted in Texas, V.T.C.A., Bus. & Comm. Code, Chapter 1, excluding any rule or principle that would refer to and apply the substantive law of another state or jurisdiction. All issues arising from this Agreement shall be resolved in the courts of Travis County, Texas and the parties agree to submit to the exclusive personal jurisdiction of such courts except as superseded by Federal Law. The foregoing, however, shall not be construed or interpreted to limit or restrict the right or ability of Licensee to seek and secure injunctive relief from any competent authority as contemplated herein.

In witness whereof, the parties have caused duly authorized representatives to execute this Agreement on the dates set forth below.

Motorola, Inc.

Name: Kicitaan

Title: JENERAL MGR. AND VICE PRESIDENT

Date: DECEMBER 26,2000

City of Austin

Name:

Date: DEC

REVIEWED AND ARTHURED AS TO FORM SCOTT DODGE

MOTOROLA CONTRACTS AND CHIPLIANCE DEPT

#### ATTACHMENTS

Attachment 1

#### Motorola Software List

- SmartZone Release 4
- 2. Radio Service Software

Attachment 2

#### Non-Motorola Sub-licensed Software List

1. Sun Microsystems Solaris Operating System

2. Hewlett-Packard Openview

- 3. Microsoft Operating System Software

4. Wonderware Intouch

38 12/25/2000 MAN 12/28/2000 58 12/25/3000 MAN 12/28/2000

#### 1. STATEMENT OF WORK

Motorola has assembled this Statement of Work (SOW) to identify the work and resources necessary to successfully design, implement, optimize and test the proposed communications system for the RDMT Project within the established timeline. This document will become part of the negotiated contract between Motorola and the Customer.

The SOW is based on the Work Breakdown Structure (WBS) involved in the installation, the installation standards, and the assignment of responsibilities for all deliverables to successfully deliver, implement, and optimize the proposed communications system.

Implementation Of The System Will Occur In Two Phases As Follows: Phase I Shall Include But Is Not Limited To The Following Tasks:

Detailed Design Review

Fleet Mapping

Fixed Network Equipment (FNE) Equipment Ordering And Manufacturing Customer Center For System Integration (CCSI) Staging Approval To Ship

Tower Site Construction

Implementation of Simulcast Systems

Implementation of Intellirepeater Sites

Installation of Radio Tower Site Interconnectivity

Installation of Console Connectivity

Installation of SmartZone Controller, Ambassador Electronic Bank (AEB) and

Associated Electronics FNE Optimization and Field Optimization

Installation of Specified Consoles And Associated Electronics

Phase I Acceptance Test Plan

Installation of Specified Portable And Mobile Radios

Technical Training and User Training

60 Day Phase I Burn In

Phase I Acceptance

#### Phase II:

Combined Emergency Communication Center (CECC) Console Installation, and Testing

Relocation of the SmartZone controller, AEB and associated electronics into the CECC

Phase II Training

Installation of Remaining Consoles

Installation of Remaining Portable and Mobile Radios

Phase II Acceptance Test Plan With a 60 Day Burn-In

Final Acceptance of System

Changes requested after the contract is implemented will be accomplished via the Change Order Procedure. The change order process is controlled by the Communications System Agreement (CSA). A change order form is provided in an Appendix of this Statement of Work.

## 1.1 MOTOROLA SYSTEM RESPONSIBILITIES (GENERAL)

Motorola will be responsible for the provision of, installation, optimization and performance of all equipment, software, and services provided by Motorola under this contract. The Customer will assume responsibility for the performance of all other equipment necessary for completion of this project not provided by Motorola. Motorola's responsibilities on this project are further defined in the Project Schedule and in the Work Breakdown Structure (WBS) which is part of this SOW. Motorola's general responsibilities include the following:

- Provide a full-time on-site Project Manager as a primary point of contact.
- Provide a project implementation team as outlined in Motorola's proposal to implement the Customer's system as defined in this SOW.
- Maintain communications with the Customer and provide the minutes of project meetings.
- Provide, manage and maintain the project schedule.
- Coordinate tasks, deliverables and resources under this contract.
- Administer safety work procedures for construction and installation.

## 1.2 CUSTOMER SYSTEM RESPONSIBILITIES (GENERAL)

The Customer's responsibilities on this project are further defined in the Project Schedule and in the Work Breakdown Structure (WBS) which is part of this SOW. The Customer's general responsibilities include:

- Provide a designated project manager for system implementation.
- Provide project resources to fulfill the Customer's responsibilities as defined in this SOW.
- Coordinate and provide site access for Motorola and its subcontractors.

- Provide Federal Communications Commission (FCC) Licenses, Electromagnetic Emmissions (EME), Federal Aviation Administration (FAA), zoning, and local permits (including, but not limited to, easements, environmental report, endangered species report, planning commission approval, variances) or any other agreements required.
- Provide commercial power for all sites based upon Motorola submitted Alternating Current (AC) power requirements.
- Ensure that Motorola has successfully completed the required training and that all radio users are trained prior to distribution of their subscriber radios and performing dispatch operations.

### 2. SYSTEM IMPLEMENTATION

Implementation of the project will proceed according to the mutually agreed Project Schedule and WBS. The WBS and project schedule define the project interdependencies, as well as reflecting the party responsible for each task. A detailed WBS is part of this SOW. Motorola's phased approach to implementation includes factory staging, site development, installation, optimization, programming, testing of the communications network, programming, installation and testing of subscriber equipment, user training, and agency specific cutover.

#### 2.1 Phase I - IMPLEMENTATION OVERVIEW

Phase I consists of radio site construction, Fixed Network Equipment (FNE) installation, acceptance testing, and the initial agency install. The goal of the implementation is to provide the Customer a reliable communications network within the proposed schedule. Motorola will work closely with the Customer to transition to the new system in an unobtrusive manner. Cutover methods may vary by departments and agencies. Development of detailed agency cutover plans will begin during the Detailed Design Review. Cutover plans are subject to approval by Each agency.

Implementation of the infrastructure will begin after approval of the Detailed Design Review Document. The implementation and operation of the infrastructure will rely upon successful installation of the equipment building foundations, equipment buildings, towers, antenna systems, radio equipment and software, power systems, management systems, alarm systems, console systems, and site interconnectivity.

After the physical installation is complete, optimization and acceptance testing will begin. Concurrent with the testing of the infrastructure, installation of the consoles and control stations will occur. Phase I Acceptance testing will not be completed until Phase I consoles and Phase I subscriber equipment are installed, fully functional and successfully tested. Tests which are impacted by console operation will not be

undertaken until the installation of the console system has been successfully completed.

Training for consoles, mobile and portable radios will begin prior to the 60-day burnin test. This will allow the Customer trainers to become proficient with the subscriber equipment prior to the system cutover.

The system manual will be developed in a phased manner in accordance with phased installation of the system. Upon successful completion of acceptance testing and within thirty (30) calendar days of the completion date, Motorola will provide a draft of the Phase I system manual for Customer review and approval in printed and electronic format. Upon receipt of the system manual, the Customer will have twenty one (21) calendar days to review and request any changes in writing to Motorola. Motorola will make appropriate changes to the system manual. At the completion of Phase II implementation and testing, the system manual will be appended to include Phase II information.

#### 2.2 Phase II - IMPLEMENTATION OVERVIEW

Phase I focuses on the installation and testing of the fixed network equipment and installation of an initial set of subscribers. Phase II focuses primarily on the installation of the dispatch console system into the Combined Emergency Communications Center (CECC) and the installation of the remaining subscriber units and the provision of the agreed upon user, manager and dispatcher training. Additionally, the master SmartZone Controller, Ambassador Electronics Bank, and all associated electronics (Console Electronics Bank, etc.) will be relocated from the auxiliary building into the CECC.

#### 2.3 PROJECT SCHEDULE

The attached project schedule in Appendix B of this SOW will contain:

- Time frame for completion of tasks
- Task Dependencies
- Project time line
- Critical path

## 2.4 PROJECT WORK BREAKDOWN STRUCTURE (WBS) OVERVIEW

The attached WBS in Appendix A summarizes the project activities.

Each WBS task contains the following information:

- WBS number and SOW Section Reference
- Action item to be performed
- Deliverable
- · Accountability for the action item
- Approval of the action item

The following sections summarize the major sections of the WBS.

## 2.4.1 FCC Licensing

800 MHz Licenses

Motorola will assist the Customer by providing necessary information for obtaining FCC licenses. The Customer will be responsible for all application costs associated with FCC licensing and frequency coordination.

Microwave Licenses

Motorola will complete all frequency coordination, which preliminarily assigns frequencies to the Customer. Following coordination, Motorola will post a Prior Coordination Notice (PCN). After the PCN, Motorola will file the application through the FCC Universal Licensing System (ULS). No application fee is required with a Taxpayer Identification Number (TIN). Once the ULS filing is complete, installation may begin. The actual license will ship to the Customer in three to six months following the filing.

## 2.4.2 Land/Lease Agreements

The Customer will be responsible for the costs associated with the negotiations and closure of site acquisition or site leases. Civil work and installation at a site will commence after the site is secured for use.

The time frame for occupancy of sites must adhere to the implementation schedule. It is the responsibility of the Customer to ensure that adherence to the schedule is met by the site owners. In the event that a site or sites are not ready for occupancy by the scheduled date, Motorola will work diligently with the Customer to minimize any financial and schedule impact that may occur.

## 2.4.3 Detailed Design Review

The Detailed Design Review (DDR) is the point at which the Customer and Motorola refine the overall design and configuration of the system. This facilitates a clear understanding of the system and its component parts to all the involved parties. The areas that will be covered include three sections: Functional Review, Site Layout Review, and Integration Review. During review of each section, Motorola will produce detailed documentation which will be subject to approval by the Customer. Motorola will not deliver any equipment to the Customer until the Detailed Design Document (DDD) is approved by the Customer, unless otherwise mutually agreed upon. The approved Detailed Design Document shall constitute the agreed upon system design and technical configuration.

Functional Review includes, radio infrastructure, radio infrastructure site feasibility, console functional design, SmartZone manager functional design, MOSCAD alarm design, outside agency interoperability design, antenna system design, radio infrastructure site interconnectivity, console site interconnectivity, and system management/alarm site connectivity. Motorola will conduct an interference study at all radio infrastructure sites to determine if special treatment will be required to eliminate interference problems. Interference problems found at radio infrastructure sites will be corrected through the change order process.

If the Customer desires to specify substitute equipment, Motorola must approve said equipment as being compatible with the overall system design. This approval must be made before Motorola will integrate the substitute equipment into the system.

If a site is determined to be unusable for the proposed system, Motorola will work in good faith with the Customer to identify an alternate site that provides minimum impact to the required coverage and minimizes the cost impact to the system.

Site Layout Review has two aspects, FNE Site Layout Review and Console Site Layout Review.

FNE Site Layout Review consists of tower/site plot layout, rack layout, floor layout, radio site power/Heating, Ventilation, Air Conditioning (HVAC) design, Tower diagram showing the proper antenna and line installation and orientation for 800 MHz and microwave antenna systems, grounding and surge suppressor system layout, for each individual site.

Console Site Layout Review consists of console physical layouts and interconnection diagrams to and from the Ambassador Electronics Bank, Central Electronics Banks and all operator positions and console power system and grounding design.

Integration Review includes integration of all Motorola provided subsystems, site interconnectivity (including repeater sites and dispatch points), preliminary installation plan, optimization plan, training plan, preliminary fleetmap plan, preliminary cutover plan, acceptance test plan review, system documentation plan, Enhanced System Support Customer Support Plan, updated Statement of Work, updated project schedule, and review of required deliverables. Motorola will work in good faith to provide assistance to facilitate successful integration of the following external systems:

Computer Aided Dispatch
GAATN interconnectivity
EMS and Fire Records Management System
Police Records Management System
Fire and EMS alerting

Motorola will provide a Centracom Gold Elite Console Application Programmers Interface (API). Motorola's Elite API programmers guide and 20 hours of product group phone support will be provided. Additional consulting services may be quoted upon request.

#### Detailed Design Document Approval Process

The deliverable for the detailed design review is a finalized Detail Design Document that is a compilation of the previously reviewed and agreed upon documentation from each section of the Detailed Design Review. The Detailed Design Document will be included as a subsection of the System Manual.

Following the integration review portion of the DDR, Motorola will deliver to the Customer the final draft DDD. Upon receipt of the final draft DDD, the Customer will have fourteen (14) calendar days to review and request any changes in writing to Motorola. Motorola will make appropriate changes to the DDD. The Customer will not withhold or delay DDD approval due to the Customer's site acquisition or development delays, even if such delays are defined as excused. If this situation

arises, the Customer shall approve the DDD, so long as Motorola provides a "typical" site drawing for the unavailable site.

## 2.4.4 System Programming Definition

System programming definition is required for both Fixed Network Equipment (FNE) and user equipment. Programming sheets for FNE will be developed and provided to Motorola's Customer Center for Systems Integration (CCSI). The Customer will be provided a copy of CCSI documentation used to originally configure the system at CCSI. After field acceptance testing has been successfully completed, as-built documentation reflecting the overall system configuration and in particular, system programming configuration will be provided to the Customer. Subscriber programming definition will begin during the Detailed Design Review.

With the large number of agencies participating in the trunked system, an organized system of fleet programming and user access privileges must be put into place. Motorola recommends that a Customer's System Manager be identified upon commencement of the project to assist Motorola in coordination of this process.

Motorola will work with the identified Customer's System Manager and user agencies to define the fleetmap plan for the entire system. Motorola will assist the user agencies in understanding the operational issues involved in developing the fleetmap plan. The fleetmap plan is essentially a matrix that defines agencies, talkgroups per agency, and interoperability between agencies. Once the plan has been mutually agreed upon and completed, Motorola will obtain final approval for the fleetmap plan from the Customer. A copy of the final plan in both printed and electronic format will be provided to the Customer. Changes made after final approval will be accommodated through the change order process.

Once the entire system fleetmap plan is defined, radio operational parameters or templates must be designed using Radio Service Software (RSS) for programming operational features in subscriber units. Motorola will assist all Customer agencies in the definition of radio template design. Motorola will develop up to two-hundred fifty (250) radio design templates up to final system acceptance. Motorola will develop these radio design templates and obtain final approval. Changes made after final approval will be accommodated through the change order process. Motorola will provide copies of all templates to the Customer. The templates need to be approved by the Customer at least 60 calendar days prior to initial subscriber installation.

Motorola will work with the Customer to define the access required to talkgroups for an agency's console dispatch operators. Motorola will provide one console template per dispatch operator position. The console template defines the talkgroups for the operator position and the Console Operator Interface Module (COIM) programming.

Motorola will configure and program the infrastructure equipment. The Customer will be responsible for data entry of individual subscriber and talkgroup records into the SmartZone Controller and console databases prior to distribution of subscriber radios.

#### 2.4.5 Radio Infrastructure Civil Work

Radio infrastructure civil work includes construction design, FAA approval, permits, grounding, construction, and inspections. Site feasibility, design and definition of specific construction requirements begin during the Detailed Design Review. After feasibility is determined, site design is completed and approved, the site work can proceed. The tasks for each site are identified in the WBS. Motorola and the Customer will be responsible for civil work per the requirements identified in the WBS.

Motorola will provide documentation to construct and permit sites. All permits and approvals, except microwave system frequency coordination and application preparation, necessary to obtain, construct and use the site are the responsibility of the Customer.

Motorola will provide site specific electrical load requirements during the Detailed Design Review. Commercial electrical service which meets the specified load shall be provided for all sites by the Customer. Electrical service and electrical wiring that meets all applicable city, county, state, and National Electrical Codes (NEC) requirements is required. For equipment shelters, the Customer supplied electric meter must be provided within 25 feet of the equipment shelter. Alternating Current (AC) power will be installed once the shelter has been set in place at the site. It is preferred that the meter be attached to the exterior of the shelter. The Customer will be responsible for ensuring temporary power is available at each tower site in accordance with the project schedule.

The Customer shall provide site access for scheduled site walks, installation, optimization, system troubleshooting, and completion of acceptance testing.

If the Customer desires telephones at the radio sites, the Customer shall supply telephone circuits, telephones, and installation.

Each site will be inspected by both Motorola and the Customer to ensure that the site is ready for equipment installation. Any items identified that do not meet the site ready criteria will be added to a punchlist and resolved through a mutually agreeable process.

Motorola will be responsible for site construction per the requirements identified in the SOW.

#### Motorola Provided Shelters

Motorola will provide and install shelters at Johnny Morris, County Satellite Three, Hamilton Pool, Round Mountain, Cow Creek, University of Texas (UT) Bergstrom, Martin Hill, Davis Lane, Lime Creek, Four Points, Creedmoor, Austrop, Elgin, UT Pickle, and UT Barton Creek.

Power feeders and branch circuits will contain an equipment grounding conductor which will have green colored THWN/THHN insulation or green identifying tape at both ends and which will be suitably terminated to an equipment ground bus or device screw terminal at both ends.

Connections to equipment room or shelter ground halos will be made as straight as possible with a minimum number of bends. The minimum bending radius of any ground wire will be one foot. Grounding of Radio Equipment Cabinets and associated Cable Trays will conform to the Motorola R56 Standards.

A ground ring consisting of a #2 American Wire Gauge (AWG) solid tinned bare copper wire will be installed in a trench at a depth of 24" below final grade or below the frost line (whichever is lower) at a maximum distance of 2 feet from the foundation of the equipment building where the equipment is installed.

The ground ring will be supplemented with copper clad steel ground rods. The ground rods will have a minimum length of 8 feet and a minimum diameter of 5/8 inches. All ground rods will be interconnected, including the AC power service and telephone ground rods, to form a ground grid with resistance of 5 Ohms or less. If soil conditions do not allow ground rods to be placed, equivalent supplemental grounding systems must be used.

The minimum requirements for the quantity of ground rods will be based on the following:

- · At least one ground rod at each corner of all equipment shelters will be installed
- Rods will be a minimum of 8' away from any structure foundation.
- The minimum distance between rods will be 16 feet
- At least one ground rod will be installed directly below the transmission line entry port
- · The top of ground rods will be 2 feet below grade

The ground rods will be bonded to the external shelter ground ring using an exothermic welding process such as Cadweld.

It will be left to the discretion of Motorola to determine the type of connector to use in the welding process. The following two restrictions, however, will be observed.

- An anti-oxidant compound will be applied to the connection point after the bond is completed.
- All connections to the ground ring will be such that the ground wires are as straight as possible with no sharp bends.

The exterior ground ring will be bonded to a minimum 6" wide copper strap descending from the shelter's cable entry bulkhead panel. The copper strap will be secured to the building exterior so as to eliminate wind vibration or flapping.

An internal ground ring (halo) will be installed in all equipment rooms or shelters which consists of #2 AWG tinned bare solid copper conductor, running continuously along each interior wall, at a maximum of 6 inches below the ceiling. Insulated mounting standoffs will be installed at a maximum separation of 2 feet to accommodate bends and avoid sag.

An internal copper ground bar will be installed such that it is located directly beneath the transmission line entry port. The ground bar will be wall-mounted on insulators, and will be drilled to provide ground connections for equipment. The ground bar may be integrated with the cable entry panel. The internal ground bar will be directly connected to the bulkhead panel and internal ground ring using an insulated #2 AWG stranded copper conductor and exothermic welding process.

The following bonding connections will be made directly by exothermic welding to the internal ground ring (halo) using green insulated #2 AWG stranded copper wire (except where noted):

- Ventilation louvers and sheet metal duct-work
- Metal doors will be grounded to the door frames (using 1 inch wide solid or braided copper flexible straps, and door frames will be exothermically welded to the internal ground ring (halo) with green insulated #2 AWG stranded copper conductor.
- Air conditioning and heating units.
- Telephone terminal block enclosure, telco repeaters and line surge protectors
- Generators may have a separate ground system that must be connected to the
  equipment via the internal halo ground ring. If the generator is outside the
  building, it will be grounded to the outer grounding.
- The neutral will be bonded to ground, at building power entrance only.
- All microwave and radio equipment, cable trays, and equipment racks.

All ground connections to equipment that are not exothermically welded will use stainless steel fasteners with toothed lock washers and/or brass or bronze connection

lugs. Paint will be removed from any painted surface before ground connections are made.

The shelter external and internal ground rings will be bonded together with #2 AWG bare solid tinned copper wire. The entrance to the equipment shelter ground system will be made through a 3/4 inch Polyvinyl Chloride (PVC) pipe terminated with bushings 6 inches above the finished floor (AFF) and 6 inches Below Finished Grade (BFG). The PVC pipe will follow the contour of the foundation. Each ground wire will terminate at the corner ground rods and will be bonded. The ground wire will run vertically along the wall supported by 2-inch insulated standoffs. The PVC pipe will be sufficiently filled with a duct sealing compound, O-Z/GEDNEY DUX1 or equivalent, through the interior side of the shelter (this compound will act as a water stop and moisture barrier).

Motorola will adhere to current lightning protection practices in providing protection to sensitive electronic equipment. At a minimum, Motorola will follow lightning protection practices.

Each transmit or receive transmission line will be protected by coaxial surge/lightning protectors, Polyphaser IS-CT50HN, or equivalent, between the transmitter combiner output and the antenna. Lightning arrestors will be grounded to the bulkhead panel.

On receiving antennas with a tower mounted amplifier, a Polyphaser IS-DC50LN series lightning arrestor or equivalent will be installed in the transmission line.

Each transmission line will be grounded at a point above the bend required to exit the tower mounted cable ladder to the ice bridge leading to the radio equipment shelter or room. These grounds will be installed in accordance with the manufacturer's specifications, and will be sealed against entry of moisture at any location where the outer sheath of the transmission line has been cut or removed.

Alternating Current powered equipment to be installed in Motorola provided equipment shelters will be equipped with a surge arrestor, MOV/gas tube combination, in addition to any surge protection equipment which may be installed across the shelter power mains.

Antenna line for Global Positioning Satellite (GPS) receivers used as frequency/time references in the simulcast system will be equipped with a gas tube surge arrestor Polyphaser IS-MR50LNZ+6 or +15, or equivalent.

Motorola will provide chain link fencing and vehicle access gates for the sites. Fencing will be an 8 foot high, 9 gauge, 2 inch zinc coated diamond mesh. Corner, line posts and gate posts (2½", 2" and 4" respectively) will also be hot-dipped galvanized. Top rail brace (1¼") and truss rods (3/8") will also be provided.

The mesh fencing material will be secured to terminal posts using stretcher bars and steel bands and line posts using wire clips.

The top of the fencing will have concertina (razor) wire with 45° extension arms pointed outside the fence area. Gates will be provided with a positive latching device to be secured by padlocks. A plunger rod and catch will be installed to secure the gate in the open position. Fence posts will be bonded to the site grounding system using an exothermic welding process (Cadweld).

Motorola is to restore the site substantially to its original condition following construction and installation activities. If planning authorities require foliage screening or other plantings at the tower sites, Motorola will arrange for professional planting of the required species of trees or shrubs.

Motorola will install stone surfacing within the fenced-in site area where new construction was performed. Material will be ¾" broken stone with 10% binder material. Two layers of polypropylene liner will be installed under the stone for foliage suppression. Prior to laying of any material, an EPA approved defoliant will be applied over the area.

A prefabricated, bullet resistant, Electronic Equipment Shelter, foundation, and ancillary equipment will be furnished and installed on a turn key basis as specified herein.

Unless otherwise modified herein, materials, design and constructions procedures will be in accordance with ANSI/NFPA-70, The National Electrical Code and all federal, state and local building codes.

Motorola will prepare and submit for approval, 3 sets of engineering drawings of the shelter during the Detail Design Review depicting its overall dimensions, electrical layout and general floor plan. These drawings will be used, as required, for obtaining zoning and building permits.

Motorola will submit for approval a suitable foundation design based upon normal soil conditions. Final foundation design and cost will be determined on receipt of a geotechnical report.

Drawings will be sealed by a registered professional engineer licensed by the State of Texas.

Construction will be concrete aggregate exterior with 5/8 inch plywood interior walls. Roofing will be designed to prevent penetration by ice falling from the tower at the site. The roof will be sloped to prevent accumulation of water. Interior walls will be designed to allow mounting of electrical and electronic equipment using standard

fasteners available from local hardware stores. The shelter will be designed to withstand wind speeds of 80 miles per hour.

There will be sufficient interior lighting to provide a level of 75 foot-candles at 3 feet above the floor. Interior light will be provided by fluorescent fixtures using two standard four foot tubes per fixture. The switch for the light fixtures will be located inside and on the latch side of the entry door. Light fixtures will be installed to the front and rear of electronic equipment racks to provide sufficient lighting for service personnel to perform equipment maintenance.

Exterior lighting will be provided adjacent to the entry door to the shelter in a manner to avoid shading by the open door. This lighting will be controlled by a photoelectric switch that allows automatic illumination and extinguishment at twilight and sunrise. Exterior lighting will be heavy duty, shatter and tamper resistant.

AC power will enter the shelter through an entrance elbow which can be rotated to accommodate connection to conduit from the power company feed. A main cutoff switch will be provided inside the shelter, followed by a distribution panel which provides for a minimum thirty branch circuit breakers.

The Equipment Room AC power will be installed in Electrical Metallic Tubing (EMT) conduit with two duplex outlets mounted along the overhead cable ladder at the top of each equipment rack space, and at four foot intervals on each of the four interior walls of the equipment shelter (EMT conduit, grounded, duplex outlets). Each outlet will be served on separate circuits. A minimum of two, or the minimum required by local electrical codes (whichever is greater) duplex outlets will be installed in the generator room of the shelter. Also, an outside duplex outlet connected to the generator will be provided on each shelter. AC power mains will be protected by an all mode surge arrestor device. All electronic equipment in the shelter will be equipped with transient voltage suppressors. The primary suppression system will be silicon avalanche diode type, with MOV backup (Northern Technology Model TCS250BL or equivalent). It will include a dry closure alarm relay, which will be connected to the site alarm system.

Motorola will provide and install a 48 volt DC 2 hour battery backup power system for critical equipment within each shelter. AC Power circuits supported by the battery back-up power system will be clearly marked.

All electrical equipment supplied will be UL listed. The entire electrical installation and wiring will be in strict compliance with the latest approved edition of the National Electrical Code and all state, city, county and local codes and ordinances.

There will be two exterior doors which will be of steel construction with a solid core. A door will be provided for entry into the equipment room and the second door for entry in to the generator room. Doors will be equipped with a Best mortise lockset and a single cylinder deadbolt lock. All radio equipment shelters will be keyed the same.

Five sets of keys will be provided to the Customer. The lockset will be protected on the exterior by an anti-prying plate. Hinges will be tamper resistant to prevent removal of the pins from the outside of the shelter.

A drip awning will be installed over each door to prevent water entry into the building. Doors will be sealed using adjustable weather stripping, and an adjustable saddle.

Low ambient temperature air conditioning equipment will be provided. Electric heat strips or other devices will be provided which will maintain the interior temperature of the shelter between 55 and 85 degrees Fahrenheit when outside temperatures are between -5 degrees Fahrenheit and 115 degrees Fahrenheit. Relative humidity will be maintained at a level acceptable to the equipment to be furnished in this procurement.

There will be two external vertical air conditioning units installed with a standard lead/lag switch arrangement set to cycle between the two units.

An auxiliary exhaust fan system will be installed including motorized louvers, thermostat, timer, and hood with permanent expanded metal dust filter and exhaust insect screen.

A minimum of eight waveguide openings, with 4 inch wall/roof feed through plates will be installed at the end of the shelter adjacent to the waveguide/ice bridge from the tower, and in alignment with interior cable ladders arranged over the equipment rack space. (Polyphaser Earth Entry Port). The feed through plate will be equipped with rubber boots, with galvanized clamps to seal the coaxial transmission line to be supplied pursuant to this procurement. Blank cable boots will be used to seal all unused entry ports. The waveguide entry panel will be covered to prevent entry of birds, insects or rodents during shipping or installation of the equipment shelter. The waveguide entry port will be attached to the exterior ground ring by #2 AWG solid copper wire or by copper ground strap.

A minimum 12 inch cable tray will be installed over all equipment rack spaces, and to the telephone equipment panel, and to any future equipment expansion space in the shelter. Cable tray sections will be bonded to one another and to the building ground halo by #2 AWG copper wire and compression fittings.

Ventilation openings will be protected by security screens to prevent unauthorized entry.

The building foundation will be concrete slab, and installed in compliance with local building codes. A concrete walkway will be installed between the shelter entry door and the gate to the fence surrounding the shelter to allow equipment to be brought into the shelter on hand trucks without tracking mud into the building.

Interior flooring will be asphalt tile, mounted over concrete. Base moldings will be installed around all perimeter walls.

#### Motorola Provided Towers

Motorola will provide and install towers at Johnny Morris, County Satellite Three, Hamilton Pool, Round Mountain, Cow Creek and UT Bergstrom

For any new sites which require tower construction, FAA approval must be granted. The Customer will apply for initial FAA approval. Motorola will provide the necessary information and support to facilitate the application Motorola will provide necessary information required for such filings.

Motorola will prepare and submit for approval, scale drawings of the tower depicting its overall height, the number and height of sections, the horizontal spread of each section, guy points (if applicable), antenna loading at specified heights and obstruction lighting details.

Motorola will submit for approval a profile view of the tower, containing structural details and engineering notes. Any documentation on the tower needed by the Customer for planning approvals will be supplied.

Drawings will be sealed by a registered professional engineer (structural) licensed by the State of Texas.

Motorola provided towers will be constructed of hot-dipped, galvanized steel. All steel materials used in the construction of the towers will be new, and will conform to the provisions of EIA-222-F with respect to physical properties, manufacture, workmanship and factory finishes.

The design of the tower will take into account dead and live loads induced by the structure itself and all appurtenances, and all stress applied to the tower and its appurtenances by wind forces. The minimum safety factors listed on EIA-222-F will apply under the most severe combination of dead load plus live loading.

Appurtenances include the following: antennas, antenna mounts, antenna platforms, microwave antennas and radomes, lighting, transmission line, transmission line hangers, cable ladder, climbing ladder and safety climbing cable system, lightning rods, conduit, waveguide bridge, lighting control, and ice shields.

Motorola provided towers have been designed per the following specifications: ANSI/E.I.A.-222-F, normal soil conditions, 80 MPH wind speed: ½" radial ice loading, strobe lighting, wave guide ladder, safety climbing cable system, climbing ladder, antenna loading for 14 (fourteen) BMR 120 antennas and 4 (four), 6' diameter

microwave dishes, elliptical waveguide, and 10 (ten) 1 1/4" coaxial cable and 4 (four) 7/8" antenna cable runs. Final foundation design and cost will be determined on receipt of a geotechnical report.

A transmission line cable ladder will be installed along the inner side of one face of each tower (nearest to the building). The cable ladder will be of galvanized steel construction, and will have mounting hardware of stainless steel or galvanized steel construction. No drilling of the tower legs or cross bracing will be required to install the cable support device.

Transmission lines will be attached to the transmission line cable ladder using stainless steel hangers and adapters of the appropriate size for the transmission line supplied. Hangers will be Andrew models 43211, 42396A-1,2,4,5,9 or equivalent. Andrew E Angle Adapter, or equivalent, kits will be used to attach the hangers to the transmission line support ladder. The transmission line will be supported in compliance with manufacturers specifications.

Transmission line will be supported on the cable ladder or ice bridge at intervals of not more than six feet, or as recommended for the wind speed design of the tower with ½ inch radial ice. (Andrew LDF5-50A, if used, will be supported at intervals of 5.5 feet or less; LDF4-50A should be supported at intervals of three feet or less).

A waveguide bridge/ice shield will be installed between the tower and the equipment room/shelter entry point to support transmission lines and to protect them from ice falling from the tower or antennas. The waveguide bridge will be supported by pipe columns if any horizontal span is 20 feet or greater, or if so required by local building codes. Galvanized steel construction will be used for the waveguide bridge and its ancillary components. A grating type of waveguide bridge is required. Microflect waveguide cushions, hangers and crosses are the preferred method of attachment to the waveguide bridge.

Tower lighting controls for new towers supplied by Motorola will be equipped with gas tube surge arrestors which will prevent a lightning strike to the tower or lighting system from back feeding into the electrical distribution system of the equipment shelter. This device will shunt surges to the tower grounding system, and will protect the tower lighting controller. An acceptable protector is Polyphaser IS-7WFU (single flasher unit) or IS-12WFU (dual flasher unit).

The towers will be lighted and/or marked in accordance with the applicable chapters of FAA Advisory Circular AC 70/7460-1G, or latest revision, as required by the particular Aeronautical Study performed by the FAA for each tower.

Activation of any required lighting systems will be via a light sensitive, photoelectric type switch and controller which will activate the lights at dusk (or other cloud darkened condition) and extinguish the lights at sunrise. If a dual lighting system is

required at any site, the controller will automatically switch from red lights at sunrise to strobe lights, and back to red lights when the sky darkens.

Wiring for the tower lighting will be enclosed in rigid galvanized steel conduit, which will be vented sufficiently to eliminate condensation buildup. Wiring and conduit will be provided and installed in conformance with the tower manufacturer's specifications and in accordance with local electrical codes.

The lighting control system will be equipped to provide a single, form "C" dry contact closure alarm indication of bulb failure. Upon bulb failure, the alarm condition will be reported by the master alarm system.

Each tower will be equipped with steel mesh ice shields to be installed above each of the microwave antennas to protect them from falling ice. The ice shield will cover the width and length of the microwave antenna it is intended to protect.

Each tower shall be equipped with a climbing ladder and safety climbing cable system.

The climbing ladder shall be 10' off the ground, and each leg shall be screened to prevent climbing by unauthorized persons.

Motorola shall perform soil testing for new sites that require a tower. Tower and shelter foundations are based on EIA/TIA-222-F or latest version - standard soil conditions at the sites. In the event that the geotechnical testing finds non-standard soil conditions and significant changes are required in the tower or shelter foundation design, Motorola will prepare a cost proposal to address the design changes needed to address the subsurface conditions at the site.

For all new equipment shelters and towers, Motorola will provide a single point system ground of (5) ohms or less, to be used on fixed equipment. Specific details of each grounding system will be provided during the detailed design review.

#### Existing or Customer Provided Radio Towers and/or Buildings

The Customer provided towers and/or buildings include CECC, Mount Larson, Martin Hill, Davis Lane, UT Robert L. Moore Building, Lime Creek, Four Points, Creedmoor, Austrop, Elgin, UT Pickle, and UT Barton Creek.

UT Robert L. Moore Building, Mount Larson, and CECC - Motorola will begin work at this existing site only after mutual agreement by the Customer and Motorola that the site is deemed ready. Customer Site Ready requirements include adequate equipment space, adequate space for cable runs, environmental control/HVAC for equipment

room, electrical service, circuit breakers, electrical outlets, and installation/wiring of Customer supplied backup power to accommodate the equipment to be installed. Customer provided sites must be free of hazardous materials such as leaking fuels, asbestos, etc.

#### **Existing Radio Tower Sites**

Motorola will begin work at existing tower sites only after mutual agreement by the Customer and Motorola that the site is deemed ready. Customer Site Ready requirements include site access, adequate space for the new equipment shelter and generator, designated area for cable runs and antennas, electrical service to the designated electric meter. Customer provided sites must be free of hazardous materials such as leaking fuels, asbestos, etc.

Motorola will perform Preliminary Site Ready audits and provide a report identifying any site deficiencies within 60 calendar days of notice to proceed. All site improvements not identified in this document specifically as a Motorola responsibility are the responsibility of the Customer.

An update to the Preliminary Site Ready Audits will be provided within 45 calendar days of completion of Detailed Design Review.

Motorola shall provide and install cabling which conforms to Federal and Local Government law and regulations regarding building, zoning and other applicable codes. Motorola will provide standard cable and line for radio infrastructure sites, unless Motorola elects to provide plenum cable for installation convenience. If plenum cable is required due to routing constraints, it will be addressed through the change order process.

For any Customer provided buildings, the Customer is responsible for providing cosmetic construction work (such as paint, masonry, wallpaper, plaster, etc.) to building interior, or exterior. Wall penetrations through wood, brick, hollow cinder block, stucco, sheet rock, or sheet metal necessary to install antenna systems are Motorola's responsibility. All penetrations to exterior walls shall be properly sealed by Motorola. Internal wall penetrations will also be sealed if required by building codes. All antenna systems shall be properly grounded and shall include the proper surge protection device in accordance with Motorola's R56 Standards and Guidelines. Other penetrations such as roof or locations requiring concrete coring shall be addressed through the change order process.

For Customer provided radio towers and buildings, the Customer shall provide a single point system ground of (5) ohms or less, to be used on fixed equipment. The ground system must include an internal site tie-point within the equipment room for Motorola supplied equipment. System transient suppression for the telephone circuits, the AC power, radio frequency (RF) cabling and grounding protection is also required

to meet or exceed the R56 requirements. Motorola is responsible for providing and installing RF surge protectors for all coaxial cables installed as part of this new system.

Motorola will provide structural engineering analysis sealed by a Texas registered professional engineer of the proper discipline, for Customer identified existing towers within Motorola's proposed design. Towers must have sufficient space and be structurally capable for the installation of additional antennas, microwave dishes and waveguide required for the new system. The Customer shall provide all structural modifications required for existing towers. New waveguide bridges necessary to support coaxial transmission lines installed by Motorola shall be provided and installed by Motorola. The Customer is responsible for any structural analysis or site upgrades for existing buildings.

The Customer is responsible for repairs or replacement of, lights, etc., associated with all existing towers and buildings that do not meet FAA requirements. The Customer is responsible for registration of all existing towers with the FCC. Motorola is not responsible for upgrading existing Customer provided towers or buildings to meet safety requirements, City codes, County codes or R56 Installation standards.

#### 2.4.6 Order, Manufacture, and Equipment Shipment

After the Detailed Design Review, Motorola will order the equipment and administer the inventory control plan. Motorola will monitor the manufacturing processes, monitor all shipping activities and control the distribution of all equipment. Motorola will provide weekly status updates on manufactured equipment and projected shipping dates.

The length of time necessary to manufacture different components of the system varies based on size and complexity. The manufacturing lead times are identified in the attached Project Schedule. Since some system components are not staged at CCSI, shipment logistics are an important part of overall system planning.

Motorola intends to utilize just-in-time shipping practices for all system components. This will minimize risk of loss liability and warehousing costs. In the event the planned destination is a Customer provided facility and is not site ready to receive the equipment, Motorola will make every effort to work with the Customer to reschedule delivery. In the event that unexpected warehousing is required and results in additional expense, such warehousing will be addressed through the change order process.

## 2.4.7 Materials Management

Motorola will provide an inventory control plan that will define all equipment routing, storage, controls and shipping destinations. Motorola will provide an equipment inventory in Microsoft Access. Fixed Network Equipment (FNE) inventory will include serial number, model, description, purchase date, install location, software and firmware version and programming template file name. Inventory of the Fixed Network will be supported by Motorola during Phase I. Ongoing management the Fixed Network Equipment inventory database will become the responsibility of the Customer upon Phase I acceptance.

During Phase I, Motorola will provide initial subscriber equipment inventory including agency, model number, serial number, and radio template filename. Ongoing management of the subscriber equipment database will be the responsibility of the Customer. All Equipment inventory tracking during Phase II will be the responsibility of the Customer.

The inventory control plan will allow Motorola to receive, distribute and account for all Motorola supplied project equipment throughout the project. The inventory control plan will be finalized during Detailed Design Review.

## 2.4.8 Training

During Detailed Design Review, Motorola will work with the Customer to develop and provide a comprehensive training program for the Customer based on the agreed upon contract. Motorola provided training for the Customer trainers will include agency specific handouts developed by Motorola for each student covering the basic operation of the dispatch consoles, mobile radios, portable radios, control stations and related accessories. Motorola will provide each Customer trainer with a electronic set of the training handouts. The final system documentation will also include an electronic set of the training handouts. The designated Customer field personnel will be trained in the technical operation of the fixed network infrastructure, microwave system, mobile and portable equipment, control stations, desktop remotes and accessories. System management training will be provided to Customer selected personnel. Training is offered in the field or in-resident classes that are held year round at Motorola's World Wide Learning facilities. The Customer shall provide all training presentation equipment and classroom space for required field training. To satisfy any request for video training tapes, Motorola will allow videotaping of the class as it is administered. This taping will be static and can not interfere with the class. Motorola can provide, as an option, professionally scripted videotape as requested.

## 2.4.9 CCSI Factory Staging

Motorola's specialized technical teams consist of factory and field project managers, project engineers, and product group personnel. These teams will set up the system at CCSI. All interface panels and cables will be installed between the various system components to provide an operational system within the staging facility. CCSI staff builds the system from the Customer approved Detailed Design Document.

During staging, a great majority of the system components will be assembled, inventoried, cabled, and brought on-line to a normal operational mode prior to delivery to the field. Motorola will identify to the Customer any equipment that is not included in factory staging, subject to Customer approval. Any changes to equipment going to factory staging will be addressed through the change order process. The factory staging plan will be finalized during Detailed Design Review. In this configuration all system components and expected functionality can be tested to ensure the correct contractual configuration. After Motorola's field engineering team is satisfied the system is operating properly, a Customer approved CCSI Functional Acceptance Test Plan is then performed and witnessed by the Customer representatives. Subsequent to the successful completion of each functional test script in the CCSI Functional Acceptance Test Plan, the system will be disassembled and shipped to the proper destinations for installation. Only at the Customer's discretion, may the system ship without passing every functional acceptance test.

The Customer will provide at least one representative with signatory authority to witness the Systems Factory staging and acceptance testing at CCSI in Motorola's Schaumburg, IL facility. The Customer will provide all travel accommodations for the Customer visits to factory staging. Motorola will provide the Customer with a seventeen (17) calendar day written notice of when the system is ready for CCSI Functional Acceptance testing. Such notice will be provided to allow the Customer to schedule reasonable airfare and accommodations. In the event that additional days or a second trip to Schaumburg are required to successfully complete the functional testing due to system problems or Motorola delays, Motorola will pay for the additional travel expenses for up to five Customer Representatives.

#### 2.4.10 Control Station Installation

Motorola will provide and install control stations, antenna systems, backup power (as required), and desksets supplied under this contract.

The Customer will provide access and the necessary space and Customer desired antenna mounting structure/location to properly install the control station equipment for each site. If the Customer requires the use of conduit, the Customer will provide it.

Motorola is not responsible for providing cosmetic improvements to building interior, or exterior. Customer provided sites must be free of hazardous conditions such as leaking fuels, asbestos, etc. Wall penetrations through wood, brick, stucco, hollow cinder block, sheet rock, or sheet metal necessary to install antenna systems are Motorola's responsibility, and will be sealed properly. Roof penetrations or locations requiring concrete coring shall be addressed through the change order process.

Cabling provided and installed by Motorola shall conform to Federal and Local Government law and regulations regarding building, zoning and other applicable codes. Motorola will provide standard cable and line for control station locations, unless the Customer purchases plenum cable or Motorola elects to provide plenum cable for installation convenience. If standard cable needs to be changed to plenum cable due to routing constraints, it will be addressed through the change order process.

For control station installation with the antenna interior to the building, a single point ground and coax surge protection is not required. Control stations will be installed with a suitable interior mounted antenna with up to 75 feet of coaxial transmission line. Other installation requirements will be addressed through the change order process.

For control station installation with the antenna exterior to the building, Motorola will ground the antenna to a Customer provided single point ground per Motorola's R56 Standard. Coax surge protection shall be provided by Motorola. Control stations will be installed with an exterior mounting bracket similar to the Rohn WN12D with up to 75 feet of ¼" superflex. Other installation requirements will be addressed through the change order process.

Motorola is not responsible for upgrading existing Customer identified control station locations to meet safety requirements, City codes, County codes or R56 Installation standards.

A site audit schedule will be developed and agreed upon during Detailed Design Review. Once the site is deemed ready, Motorola will install the control stations utilizing installation procedures per the SOW and Motorola's R56 Installation Specification. All wiring shall be neatly dressed and shall be hidden from view whenever possible. Motorola and the Customer will inspect the installations for approval. The Customer shall supply, electrical service, outlets, etc. at each control station location.

#### 2.4.11 Console Installations

Motorola will provide and install the dispatch console system including the Ambassador Electronics bank, Central Electronics Banks (CEB), Uninterruptable

Power Supply (UPS) (as required), Console Server, closed Console Local Area Network (LAN), cabling (as required), console operator computers, software, and accessories supplied under this contract. Consoles that can not be installed due to Customer delay will be warehoused at Customer expense. At the CECC, the CEBs will be installed in 90" x 19" EIA relay racks. Other Dispatch Centers with CEBs (if any) will have the CEBs mounted in 70" cabinets with 19"EIA racks.

Motorola will provide an RJ57 connection per 8 track Logging Recorder Interface (LORI) to the Customer supplied logging recorder. Each LORI is supplied with an RJ57 cable and a 25-pair punchblock. Details of the demarcation locations will be addressed during the Detailed Design Review.

Motorola will install AC power line transient and surge suppression devices for the console system (as required) per the R56 Installation Standard.

Cabling between the central electronics and other system components shall be connected at a demarcation point that will be defined during the Detailed Design Review. The demarcation point is typically a type 66 punch block.

The Customer will provide access for installation of Motorola supplied console equipment for each location. Motorola shall provide and install cabling which conforms to Federal and Local Government law and regulations regarding building, zoning and other applicable codes. For the CECC, the Customer will provide and install the LAN cabling for the closed console LAN. Motorola will provide up to 300 feet of plenum seven pair cable between the Console Electronics Bank (CEB) and each dispatch operator position located at the CECC, and other console installation cabling and locations will utilize standard cable and line. Motorola may elect to provide plenum cable for installation convenience. If plenum cable, not identified as Motorola provided, is required due to routing constraints, it will be addressed through the change order process.

Site Ready Audits will be conducted per a mutually agreed upon schedule developed during Detail Design Review. Once a site is deemed ready, Motorola will install the console equipment per the SOW and Motorola's R56 Installation Specification. Motorola is not responsible for upgrading existing Customer identified console equipment locations to meet safety requirements, City codes, County codes or R56 Installation standards. Customer Site Ready requirements include Customer provided site links, single point ground, site access, adequate space, obstruction free area for cable runs (e.g. conduit or raised computer floor), environmental control/HVAC, electrical service, circuit breakers, electrical outlets, and installation/wiring of Customer supplied backup power to accommodate the equipment to be installed. The Customer is responsible for providing cosmetic construction work (such as paint, masonry, wallpaper, plaster, etc.) to building interior, or exterior. Customer provided

sites must be free of hazardous conditions such as leaking fuels, asbestos, etc. Motorola and the Customer will inspect the installations for approval.

## 2.4.12 Site Connectivity

#### Radio Infrastructure Sites

Motorola will provide SONET loop microwave for the proposed simulcast sites. Motorola will provide spur microwave for the Western and Eastern Intellirepeater sites.

For Motorola provided microwave, Motorola will perform physical path surveys. The path surveys will begin during the functional design section of the Detailed Design Review. Frequency coordination will follow path surveys. Final path engineering will occur after the physical path surveys. Once frequencies have been authorized by the FCC for use, manufacturing of the microwave equipment will begin. Microwave equipment will be factory staged by the Customer approved microwave manufacturer. The microwave equipment will be tested per microwave factory acceptance test and operational prior to integration with the radio infrastructure equipment. Motorola will inspect all installations and perform a link audit test for all site links in the system per the circuit requirements in Appendix D General Circuit Descriptions and Specifications.

#### Consoles

The Customer shall provide inter-site connectivity for console dispatch subsystems located outside the Combined Emergency Communications Center. The required circuits and specifications will be detailed by Motorola during the Detailed Design Review. For a general description of various circuit requirements see Appendix D General Circuit Descriptions and Specifications.

#### System Management and Alarm Terminals

The Customer shall provide inter-site connectivity for system management and alarm terminals. The required circuits and specifications will be detailed during the Detailed Design Review. For a general description of various circuit requirements see Appendix D General Circuit Descriptions and Specifications. .

#### 2.4.13 Radio Infrastructure Installation

Motorola will provide and install the radio infrastructure, including but not limited to new towers, shelters, power systems, management systems, microwave subsystem, SmartZone equipment, Simulcast System, Intellirepeater sites, system software, associated LANs and associated equipment and software as supplied under this contract. Motorola will install the radio infrastructure equipment as defined by the Statement of Work. Site installation will be per site layouts approved during Detail Design Review. Site links will be verified and tested. Motorola will verify correct operation of all Motorola supplied equipment as the equipment is installed. Problems encountered will be documented, reported to the Customer project manager and corrected as soon as possible. Delays impacting the project milestone completion dates will be identified and reported to the Customer project manager within 24 hours of identification.

Should interference occur, Motorola will correct issues resulting from the installation of equipment supplied under this contract. Other interference issues will be addressed through the change order process.

## 2.4.14 System Optimization

Motorola's System Technologists will optimize the entire system once the Fixed Network Equipment has been verified as correctly installed. Further, Motorola will verify and reset as necessary, all audio and data levels between Motorola supplied equipment and the Customer provided inter-site transmission network demarcation points. Checklists will be created during the optimization process to document the testing and verification of the equipment. Optimization problems impacting the project milestone completion dates will be reported to the Customer project manager as soon as possible. Customer representatives may observe the optimization process.

## 2.4.15 Subscriber Equipment

The Motorola Program Manager will work closely with the Customer's Project Manager to schedule and manage the installation of subscribers for the agencies included in the project. Motorola will work with the Customer to develop a prototype installation as a reference for each category of vehicle. Installation will be generally based upon the approved prototype and be generally the same for each vehicle category. Motorola understands that it is unlikely that vehicle installs will be identical from one agency to another. Any significant changes to the prototype standards such as relocating the radio, other in-vehicle equipment, gun mounts etc., will be handled through the change order process. Mobile radio antennas will be roof mounted whenever possible. Vehicle categories will be defined during Detailed Design Review.

The Customer will deliver vehicles to Motorola, which require mobile radio installations, on a schedule that is mutually agreed upon by the Customer and

Motorola. Access to the vehicles will be Monday through Friday between the hours of 8:00 A.M. to 5:00 PM, unless otherwise agreed upon by the Customer and Motorola. Upon arrival at the installation facility, all hazards shall be removed from the vehicle including and not limited to firearms, live ammunition, canine, explosive devices, etc. All vehicles shall be in suitable condition for radio installation work. All vehicles are required to have 12VDC (nominal) negative ground power systems. Any power converters required are the Customer's responsibility.

The Customer will provide the appropriate documentation so that Motorola can install Customer purchased headset interfaces.

If mobile radio units are requested to be installed at the Customer location, the Customer will provide adequate space, out of the weather (sun, rain, etc.) with electrical power available within 50 feet

Motorola will install equipment to meet the agreed upon timeline. Motorola will remove and take possession of Customer subscriber radio equipment.

#### 2.4.16 Phase I Acceptance Tests

Motorola will test the radio infrastructure equipment in accordance with a mutually agreed upon Acceptance Test Plan (ATP) which includes: CCSI Staging Functional Acceptance Test, Field Functional Acceptance Test, Coverage Acceptance Test, and 60 Day Operational Burn-in Test. Phase I system acceptance shall be performed as defined in the Communications Systems Agreement (CSA).

## 2.4.17 Transition System to Warranty

The warranty for the Equipment provided as part of this project will commence in accordance with the CSA. Prior to commencement of Phase I warranty, the Motorola and the Customer will develop an Enhanced System Support (ESS) Customer Support Plan to describe how warranty services will be provided. The development of the plan will begin during DDR.

## 2.4.18 Phase II Subscriber Equipment Installation

In accordance with the agreed upon project plan, the remaining subscriber units, purchased and ready for installation within the time frame of the contract schedule, will be installed. The Customer will provide the vehicles for mobile installation according to the agreed upon schedule and Motorola will make every effort to ensure installations are completed according to the schedule. Should any mobile radio installation delays be encountered, Motorola or the Customer will promptly notify the Customer or Motorola Project Manager of the delay and the plans for dealing with the delay. Portable radios will be programmed and operationally checked in accordance with the agreed upon schedule. The Customer and Motorola may mutually agree to

alter the subscriber installation schedule. Phase II subscriber installations will be performed in accordance with the Subscriber Equipment Section of the SOW. Motorola and the Customer will provide the appropriate user training in accordance with the mutually agreed upon training plan.

#### 2.4.19 Phase II CECC Preparations for Equipment Relocation and Installation

The Project Manager will notify Motorola 30 calendar days prior to when the CECC building will be available for Motorola to begin equipment installation. The Customer will provide floor space for the Motorola provided equipment. The Customer will provide, primary and backup power as required for equipment at the CECC location. The Customer will provide conduit between the CECC facility and the on-site radio tower. The Customer will provide and install cabling for the closed Console LAN at the CECC. Motorola will provide and install plenum rated 7 pair console control cable to CECC operator positions. The Customer and Motorola will work together to ensure the needs of the trunked radio system are considered during the design and construction of the CECC.

Motorola and Motorola's subcontractors will be given the appropriate security privileges for CECC access, provided the appropriate information has been submitted to the Project Manager two weeks prior to beginning work. Each person that will be performing work will need security privileges established. It is anticipated that most work will occur on weekdays, excluding holidays, between the hours of 7 AM and 6 PM. Moving the equipment from the CECC auxiliary building to the CECC main building will require 7 day X 24 hour access. Motorola and its subcontractors shall comply with all CECC job site safety regulations and practices.

After Motorola has received the 30 calendar day notification of CECC completion, Motorola will make a site readiness review. This review will ensure that the CECC is in a condition appropriate for the installation of the Equipment. Motorola will promptly notify the project manager of any discrepancies so that they can be corrected.

After completing the CECC site readiness review and ascertaining that any needed corrections have been made, Motorola will begin the preparation for the equipment move and the installation of the dispatch console system for the CECC.

# 2.4.20 Phase II Equipment Relocation from Auxiliary Building to CECC

After completing move preparation work at the CECC and at a Motorola recommended and Customer agreed upon time, the master zone controller, ambassador electronics bank and associated equipment will be re-located from the

auxiliary building into the CECC equipment room. Prior to beginning this work, Motorola and the Customer will have developed, tested and re-tested a plan to ensure minimal interruption and inconvenience to users already using the trunked radio system. During this move, Motorola and the Customer agree to make all the needed resources completely available to ensure all tasks for this move are completed on or ahead of schedule.

## 2.4.21 Phase II Installation of the Dispatch Console System

Upon successful completion of the equipment move to the Combined Emergency Communications Center (CECC), Motorola will complete the installation of the dispatch console system for the CECC. The equipment to be installed will consist of equipment designated in the contract. In addition to the installation of the CECC dispatch console systems, Motorola will also install any remaining remote consoles not installed in Phase I. The Customer agencies will be responsible for providing the necessary connectivity in a timely manner prior to the installation of these Phase II remote consoles. Phase II console installations will be performed in accordance with Console Installations Section of the SOW.

Motorola and the Customer will provide the appropriate dispatcher and dispatcher supervisor training to the new users for the dispatch consoles in accordance with the training plan. Additional technical training may be provided as needed during the implementation of the dispatch console system in accordance with the contract. The Customer will provide a 90 day notice to Motorola for additional technical training.

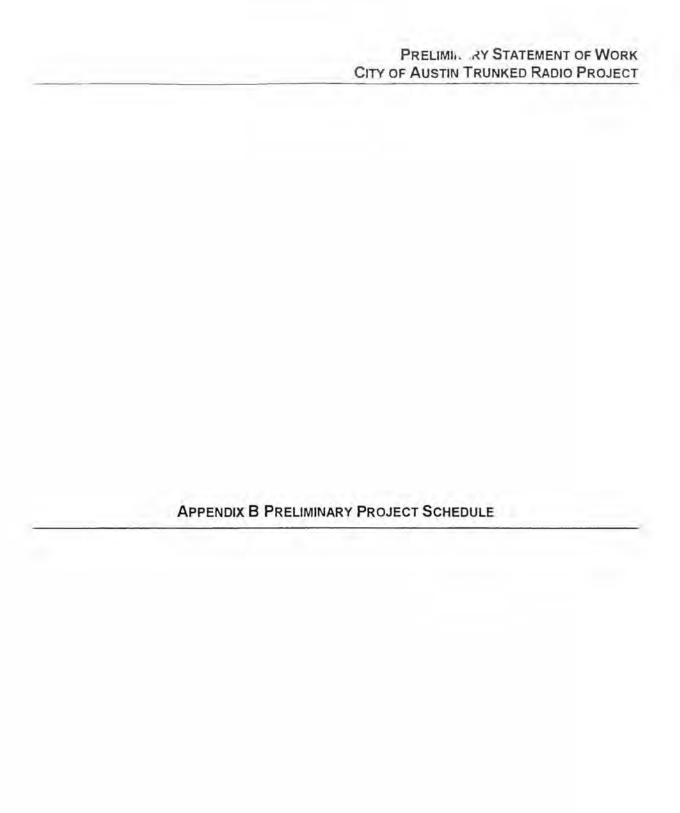
## 2.4.22 Phase II Acceptance Tests

Phase II Acceptance tests include Site Move Functional Verification, Dispatch Console Functional Tests, and 60 Day Operation Burn-in Tests.

Testing of the installed Phase II console equipment will be done in accordance with the Acceptance Test Plan. The Phase II 60 Day Operational Burn-In Testing must occur while Equipment purchased for Phase I is under warranty or a maintenance contract. Final System Acceptance shall be performed as defined in the Communications Systems Agreement (CSA).

Within 30 calendar days after the successful completion of the 60 Day Operational Burn-in test, Motorola will provide the Customer with 'As-built' documentation for the CECC and remote dispatch console systems. Upon receipt of the amended system manual, the Customer will have twenty one (21) calendar days to review the amended system manual. Motorola will make appropriate changes and provide the document to the Customer.





D	Task Name Duration Start Finish				
1	Phase I - 911-RDMT Radio Project	605 days	Tue 12/26/00	Wed 5/21/03	Predecessor
-	Contract Executed	0 days	Tue 12/26/00	Tue 12/26/00	
3	Kick-off Meeting	1 day	Fri 1/26/01	Fri 1/26/01	25F+23 days
4					
5	Customer License and Land Acquisition	168 days	Fri 1/26/01	Tue 9/25/01	3
6	Preliminary Land / Lease Acquisition	30 days	Mon 1/29/01	Fri 3/9/01	
7	Land / Lease Acquisition Complete	200 edays	Fri 3/9/01	Tue 9/25/01	
8	FCC License (Microwave)	30 days	Fri 7/13/01	Thu 8/23/01	481
9	FGC License (Two Way)	90 edays	Fri 1/26/01	Thu 4/26/01	
10		400 40.00	F-Caleeroa	TI	
11	Detailed Design Review	136 days	Fri 1/26/01	Thu 8/9/01 Mon 2/5/01	3
12 13	DDR Preparation Preliminary Site Audits	5 days 60 adays	Tue 1/30/01 Fri 1/26/01	Tue 3/27/01	9
14	Functional Review	30 days	Tue 2/6/01	Mon 3/19/01	
15	Radio Infrastructure Functional Design	30 days	Tue 2/6/01	Mon 3/19/01	14
16	Radio In rastructure Site Feasibility	30 days	Tue 2/6/01	Mon 3/19/01	
17	Interference Studies	30 days	Tue 2/6/01	Mon 3/19/01	
18	Console Functional Design	30 days	Tue 2/6/01	Mon 3/19/01	
19	SmartZone Manager Design	30 days	Tue 2/6/01	Mon 3/19/01	
20	MOSCAD Alarm Design	30 days	Tue 2/6/01	Mon 3/19/01	
21	Outside Agency Interoperability Design	30 days	Tue 2/6/01	Mon 3/19/01	
22	Antenna System Design	30 days	Tue 2/6/01	Mon 3/19/01	
23	Radio Infrastructure Site Connectivity	30 days	Tue 2/6/01	Mon 3/19/01	
24	Console Site Connectivity	30 days	Tue 2/6/01	Mon 3/19/01	
25	System Management and Alarm Terminal Site Connectivity	30 days	Tue 2/6/01	Mon 3/19/01	
26	Functional Review Complete	0 days	Mon 3/19/01	Mon 3/19/01	
27	Site Layout Review	30 days	Tue 3/20/01	Tue 5/1/01	26
28	Tower/Site Plot Diagrams	30 days	Tue 3/20/01	Tue 5/1/01	
29	Rack Drawings - Elevation View	30 days	Tue 3/20/01	Tue 5/1/01	
30	Floor Layout Drawings - Plan View	30 days	Tue 3/20/01	Tue 5/1/01	
31	Fixed Network Equipment (FNE) Power/HVAC design	30 days	Tue 3/20/01	Tue 5/1/01	
32	Console Physical Layouts	30 days	Tue 3/20/01	Tue 5/1/01	
31	Console Power Design	30 days	Tue 3/20/01	Tue 5/1/01	
34	Site Layout Review Complete	0 days	Tue 5/1/01	Tue 5/1/01	
35	Integration Review	30 day	Wed 5/2/01	Wed 6/13/01	34
36	Preliminary System Fleetmap Plan	30 days	Wed 5/2/01	Wed 6/13/01	
37	Preliminary Cutover Plan	30 days	Wed 5/2/01	Wed 6/13/01	
38	Acceptance Test Plan Review	30 days	Wed 5/2/01	Wed 6/13/01	
	Training Plan	30 days	Wed 5/2/01	Wed 6/13/01	
. 6	System Documentation Plan Inventory Control Plan	30 days	Wed 5/2/01	Wed 6/13/01 Wed 6/13/01	
41	Customer Support Plan	30 days	Wed 5/2/01 Wed 5/2/01	Wed 6/13/01	
43	Statement of Work		Wed 5/2/01	Wed 6/13/01	
44	Project Schedule	30 days 30 days	Wed 5/2/01	Wed 6/13/01	
45	Integration Review Complete	0 days	Wed 6/13/01	Wed 6/13/01	35
46	Final Detailed Design Document Review & Comments	14 edays	Wed 6/13/01	Wed 6/27/01	
47	Detailed Design Document Revised and Resubmitted	30 days	Thu 6/28/01	Thu 8/9/01	
4B	Detailed Design Review Complete	0 days	Thu 8/9/01	Thu 8/9/01	
49	Dotalica Bodigi (10 trati = 0 tilpista		1110 0000	1114 4 4171	
0	Radio Infrastructure Civil Work Preparation	134 days	Tue 2/20/01	Wed 8/29/01	
51	Soil Tests	30 days	Tue 3/20/01	Tue 5/1/01	14
52	Structural Analysis	50 days	Tue 2/20/01		1455+10 days
3	Site Construction Design	80 days	Wed 5/2/01	Thu 8/23/01	And the fact that the same of
54	FAA Approval	120 edays	Tue 5/1/01	Wed 8/29/01	27
55	Permits Available	0 days	Wed 8/29/01	Wed 8/29/01	
6	Temporary Power	0 days	Wed 8/29/01	Wed 8/29/01	53,54
57	Civil Work Preparation Complete	0 days	Wed 8/29/01	Wed 8/29/01	
58	Updated Site Ready Audits	45 edays	Thu 8/9/01	Sun 9/23/01	11
59			The second		U.Sec
30	Order and Manufacture Equipment	90 days	Thu 6/28/01	Fri 11/2/01	46
51	Order Equipment	30 days	Thu 6/28/01	Thu 8/9/01	
32	Order Towers & Buildings	10 days	Thu 6/28/01	Thu 7/12/01	
33	Order Microwave	15 days	Thu 6/28/01	Thu 7/19/01	
34	Order Infrastructure	30 days	Thu 6/28/01	Thu 8/9/01	
55	Manufacturing	80 days	Fri 7/13/01	Fri 11/2/01	
6	RF Equipment	60 days	Fri 8/10/01	Fri 11/2/01	
7	MW Equipment	30 days	Fri 8/24/01	Fri 10/5/01	63,8
8	Buildings/Towers	63 days	Fri 7/13/01	Wed 10/10/01	200
39	Manufacture building and tower	60 days	Fri 7/13/01	Fri 10/5/01	
70	Start Shipping Towers	2 days	Mort 10/8/01	Tue 10/9/01	
/1	Start Shipping Buildings	3 days	Mon 10/8/01	Wed 10/10/01	69
2	6 - 6 - 1 - 5 - 5 - 5 - 5 - 5 - 5 - 5 - 5 - 5	4000	HO WINESER	TARETT THE STATE OF THE	
73	System Programming Definition	341 days	Fri 8/10/01	Wed 12/18/02	000
74	Infrastructure Programming and Configuration for CCSI	0 days	Fri 11/16/01		60F5+10 days
75	Finalize Fleetmap Plan	50 days	Fn 8/10/01	Fn 10/19 01	
6	Subscriber Template Development	150 days	Mon 10/22/01	Wed 5/29 02	
-	Phase I Subscriber Templates Complete	0 days	Wed 5/29/02	Wed 5/29/02	
/9	Phase I Console Templates Complete	0 days	Tue 11/19/02		640SF-10 days
	SmartZone and Console Database Entry Complete	0 days	Wed 12/18 02	Wed 12/18/02	045

D	Task Name	Duration	Start	Finish	Predecessors
7					
1	Staging of Infrastructure Equipment	109 days	Mon 10/8/01	Fri 3/15/02	
2	Staging Microwave Equipment	30 days	Mon 10/8/01	Fri 11/16/01	7-2-
13	Staging - Radio In/rastructure Equipment Final Documentation Review for Staging	89 days	Mon 11/5/01 Mon 11/19/01	Fri 3/15/02	60FS+10 days
85	Equipment Set Up	42 days	Mon 11/5/01	Wed 1/9/02	the second secon
86	Integration and Optimization	23 days	Thu 1/10/02	Mon 2/11/02	
87	Notice to Customer of Staging ATP (17 day notice)	0 days	Sat 1/26/02		8855-17 edays
88	Customer ATP (Staging)	14 days	Tue 2/12/02	Fri 3/1/02	
89	Documentation (CCSI As-Built)	10 days	Mon 3/4/02	Fri 3/15/02	
90	Staging Acceptance	0 days	Fn 3/1/02	Fri 3/1/02	88
91	Ship to Austin	10 days	Mon 3/4/02	Fri 3/15 02	90
92					100
93	Civil Work	132 days	Wed 8/29/01	Tue 3/12/02	
94	CECC (Customer Bldg & Twr)	4 days	Thu 11/1/01	Tue 11/6/01	
95	Construction and Site Ready Work	0 days	Thu 11/1/01	Thu 11/1/01	SERVER TO ALL.
96 97	Complete Structural Upgrades	0 days	Thu 11/1/01		151SF-7 days
98	Complete FAA Lighting Modifications	0 days	Thu 11/1/01		151SF-7 days 151SF-7 days
99	Provide Space for Equipment Provide Space for Cables	0 days	Thu 11/1/01		151SF-7 days
00	Provide Environmental Control	0 days	Thu 11/1/01		151SF-7 days
01	Provide Utilities - Commercial Power and Telephone Service	0 days	Thu 11/1/01		151SF-7 days
02	Provide Back-up AC Power/Generator	0 days	Thu 11/1/01		1515F-7 days
03	Complete Electrical Work	0 days	Tru 11/1/01		151SF-7 days
04	Provide AC Surge Protection	0 days	Thu 11/1/01		151SF-7 days
05	Provide Grounding System for Shelter	0 days	Thu 11/1/01		1515F-7 days
06	Provide Grounding System for Tower	0 days	Thu 11/1/01		151SF-7 days
07	Install Waveguide Bridge	0 days	Thu 11/1/01		151SF-7 days
80	Verify Site Ready	4 days	Thu 11/1/01	Tue 11/6/01	
09	Sife Ready Audit	1 day	Thu 11/1/01	Thu 11/1/01	
10	Resolve Punchlist	3 days	Fri 11/2/01	Tue 11/6/01	
11	Site Ready	0 days	Tue 11/6/01	Tue 11/6/01	108
12	UT RLM (CustomerBldg/Twr)	6 days	Thu 11/1/01	Thu 11/8/01	
13	Construction and Site Ready Work	2 days	Thu 11/1/01	Mon 11/5/01	15:05 5 4
14	Complete Structural Upgrades	0 days	Mon 11/5/01		151SF-5 days
15	Complete FAA Lighting Modifications	0 days	Mon 11/5/01		151 SF-5 days
16	Provide Space for Equipment Provide Space for Cables	0 days	Mon 11/5/01 Mon 11/5/01		151SF-5 days 151SF-5 days
8	Provide Environmental Control	0 days	Mon 11/5/01		151SF-5 days
9	Provide Utilities - Commercial Power and Telephone Service	0 days 0 days	Mon 11/5/01		151 SF-5 days
20	Provide Back-up AC Power/Generator	0 days	Mon 11/5/01		151SF-5 days
21	Complete Electrical Work	0 days	Mon 11/5/01		151SF-5 days
22	Provide AC Surge Protection	0 days	Mon 11/5/01		1516F-5 days
23	Provide Grounding System for Sheter	0 days	Mon 11/5/01		1515F-5 days
24	Provide Grounding System for Tower	0 days	Mon 11/5/01		151SF-5 days
25	Install Waveguirle Bridge	2 days	Thu 11/1/01		1515F-5 days
26	Verify Site Rearry	4 days	Mon 11/5/01	Thu 11/8/01	
27	Site Ready Audit	1 day	Mon 11/5/01	Mon 11/5/01	
28	Resolve Punchlist	3 days	Tue 11/6/01	Thu 11/8/01	
29	Site Ready	0 days	Thu 11/8/01	Thu 11/8/01	126
30	UT Pickle (Customer Twr & Mot Provided Shelter)	51 days	Wed 8/29/01	Fri 11/9/01	
31	Construction and Site Ready Work	46 days	Wed 8/29/01	Fri 11/2/01	67
32	Tower Structural Upgrades	0 days	Wed 8/29/01	Wed 8/29/01	
33	FAA Lighting Modifications Clear/ Grade Land	0 days 6 days	VVed 8/29/01 Thu 8/30/01	Wed 8/29/01 Fri 9/7/01	
35	Dig and Frame Foundation	4 days	Mon 9/10/01	Thu 9/13/01	
36	Pour Foundation	2 days	Fri 9/14/01	Mon 9/17/01	
37	Foundation Cure	15 days	Tue 9/18/01	Mon 10/8/01	
38	Install Grounding System for Tower	0 days	Mon 10/8/01	Mon 10/8/01	
39	Set Shelter	4 days	Thu 10/11/01	Tue 10/16/01	
40	Install Grounding System for Shelter	2 days	Wed 10/17/01	Thu 10/18/01	
41	Provide Utilities - Commercial Power and Telephone Service	0 days	Tue 10/16/01	Tue 10/16/01	
42	Install Generator	2 days	Fri 10/19/01	Mon 10/22/01	
43	Final Site Electrical	2 days	Tue 10/23/01	Wed 10/24/01	
44	Install Waveguide Bridge	2 days	Thu 10/25/01	Fri 10/26/01	
45	Install Fencing	4 days	Mon 10/29/01	Thu 11/1/01	
46	Site Restoration	1 day	Fri 11/2/01	Fri 11/2/01	145
47	Verify Site Ready	5 days	Mon 11/5/01	Fri 11/9/01	104
48	Building Inspection	1 day	Mon 11/5/01	Mon 11/5/01	
49	Site Ready Audit	1 day	Tue 11/6/01	Tue 11/5/01	
50 51	Resolve Punchlist	3 days	Wed 11/7/01	Fn 11/9/01	
52	Site Ready Martin Hill (Customer Twr & Mot Provided Shalter)	0 days	Fri 11/9/01 Wed 8/29/01	Fn 11/9/01 Wed 11/14/01	147
53	Martin Hill (Customer Twr & Mot Provided Shelter)  Construction and Site Ready Work	54 days 49 days	Wed 8/29/01 Wed 8/29/01	Wed 11/14/01 Wed 11/7/01	
54	Tower Structural Upgrades	0 days	Wed 8/29/01	Wed 8/29/01	57
55	FAA Lighting Modifications	0 days	Wed 8/29/01	Wed 8/29/01	
5	Clear Grade Land	6 days	Fri 9/7/01		57FS+5 days
7	Dig and Frame Foundation	4 days	Mon 9/17/01	Thu 9/20/01	
	Pour Foundation	2 days	Fri 9/21/01	Mon 9/24/01	

D	Task Name	Duration	Start	Finish	Predecessors
9	Foun ation Cure	15 days	Tue 9/25/01	Mon 10/15/01	
5	Install Grounding System for Tower	0 days	Mon 10/15/01	Mon 10/15/01	
61	Set Shelter	4 days	Tue 10/16/01	Fri 10/19/01	
62	Install Grounding System for Shelter	2 days	Mon 10/22/01	Tue 10 23 01	161
63	Provide Utilities - Commercial Power and Telephone Service	0 days	Fri 10/19/01	Fri 10/19/01	
64	Install Generator	2 days	Wed 10/24/01	Thu 10/25/01	
165	Final Site Electrical	2 days	Fri 10/26/01	Mon 10/29/01	
166	Install Waveguide Bndge	2 days	Tue 10/30/01	Wed 10/31/01	
167	Install Fencing	4 days	Thu 11/1/01	Tue 11/6/01	
168	Site Restoration	1 day	Wed 11/7/01	Wed 11/7/01	167
69	Verify Site Ready	5 days	Thu 11/8/01	Wed 11/14/01	
170	Building Inspection	1 day	Thu 11/8/01	Thu 11/8/01	
71 172	Site Ready Audit	1 day 3 days	Fri 11/9 01 Mon 11/12/01	Fri 11/9 01 Wed 11/14/01	
173	Site Ready	0 days	Wed 11/14/01	Wed 11/14/01	
74	Johnny Morris (Mot Provided Twr & Shelter)	72 days	Mon 9/10/01	Thu 12/20/01	103
75	Construction and Site Ready Work	68 days	Mon 9/10/01	Fri 12/14/01	134
76	Clear/ Grade Land and Build Road	12 days	Mon 9/10/01	Tue 9/25/01	104
177	Dig and Frame Foundation	11 days	Wed 9/26/01	Wed 10/10/01	135 176
78	Pour Foundation	3 days	Thu 10/11/01	Mon 10/15/01	
79	Foundation Cure	20 days	Tue 10/16/01	Mon 11/12/01	
80	Construct Tower	12 cays	Tue 11/13/01	Fn 11/30 01	
91	Notify FAA Tower Construction Complete	0 days	Fri 11/30/01	Fri 11/30 01	
82	Install Grounding System for Tower	3 days	Mon 12/3/01	Wed 12/5/01	
83	Set Shelter	4 days	Mon 12/3/01	Thu 12/6 01	
84	Install Grounding System for Shelter	2 days	Fri 12/7/01	Mon 12/10/01	
85	Provide Utilities - Commercial Power and Telephone Service	0 days	Thu 12/6/01	Thu 12/6/01	
86	Install Generator	2 days	Tue 12/11/01	Wed 12/12/01	
87	Final Site Electrical	2 days	Thu 12/13/01	Fri 12/14/01	
88	Install Waveguide Bridge	2 days	Mon 12/3/01	Tue 12/4/01	
89	Install Fencing	4 days	Wed 12/5/01	Mon 12/10/01	188
90	Site Restoration	1 day	Tue 12/11/01	Tue 12/11/01	189
91	Verify Site Ready	4 days	Mon 12/17/01	Thu 12/20/01	
92	Building Inspection	1 day	Mon 12/17/01	Mon 12/17/01	
93	Site Ready Audit	1 day	Mon 12/17/01	Mon 12/17/01	
94	Resolve Punchlist	3 days	Tue 12/18/01	Thu 12/20/01	
95	Site Ready	0 days	Thu 12/20/01	Thu 12/20/01	191
96	Four Points (Customer Twr & Mot Provided Shelter)	49 days	Fri 9/14/01	Mon 11/25/01	X06-5
7	Construction and Site Ready Work	44 days	Fri 9/14/01	Thu 11/15/01	156
3	Tower Structural Upgrades	0 days	Fn 9/14/01	Fri 9/14/01	
19	FAA Lighting Modifications	0 days	Fri 9/14/01	Fri 9/14/01	
200	Clear/ Grade Land	6 days	Mon 9/17/01	Mon 9/24/01	
201	Dig and Frame Foundation	4 days	Tue 9/25/01	Fri 9/28/01	
202	Pour Foundation	2 days	Mon 10/1/01	Tue 10/2/01	
203	Foundation Cure	15 days	Wed 10/3/01	Tue 10/23/01	
204	Install Grounding System for Tower	0 days	Tue 10/23/01	Tue 10/23/01	
205	Set Shelter	4 days	Wed 10/24/01		203,70FS+2 days
206	Install Grounding System for Shelter	2 days	Tue 10/30/01	Wed 10/31/01	
07	Provide Utilities - Commercial Power and Telephone Service	0 days	Mon 10/29 01	Mon 10/29/01	
08	Install Generator	2 days	Thu 11/1/01	Fri 11/2/01	
09	Final Site Electrica	2 days	Mon 11/5/01 Wed 11/7/01	Tue 11/6/01	
11	Install Waveguide Bridge	2 days	and the second second second second second	Thu 11/8/01	
12	Install Fencing	4 days	Fn 11/9/01	Wed 11/14/01 Thu 11/15/01	
13	Site Restoration Verify Site Ready	1 day	Thu 11/15/01 Fri 11/16/01	Mon 11/26/01	211
14	Building Inspection	1 day	Fri 11/16/01	Fri 11/16/01	197
15	Site Ready Audit	1 day	Mon 11/19 01	Mon 11/19/81	
16	Resolve Punchlist	3 days	Tue 11/20/01	Mon 11/26/01	
17	Site Ready	0 days	Mon 11/26/01	Mon 11/26/01	
18	UT Bergstrom (Mot Provided Twr & Shelter)	69 days	Wed 9/26/01	Tue 1/8/02	-10
19	Construction and Site Ready Work	65 days	Wed 9/26/01	Wed 1/2/02	
20	Clear/ Grade Land and Build Road	12 days	Wed 9/26 01	Thu 10/11/01	176
21	Dig and Frame Foundation	11 days	Fri 10/12/01	Fri 10/26/01	
22	Pour Foundation	3 days	Mon 10/29 01	Wed 10/31/01	
23	Foundation Cure	20 days	Thu 11/1/01	Fri 11/30/01	
24	Construct Tower	12 days	Mon 12/3 01	Tue 12/18/01	
25	Notify FAA Tower Construction Complete	0 days	Tue 12/18/01	Tue 12/18/01	
26	Install Grounding System for Tower	3 days	Wed 12/19/01	Fri 12/21/01	
27	Set Shelter	4 days	Wed 12/19/01	Thu 12/27/01	
25	Install Grounding System for Shelter	2 days	Fri 12/28/01	Mon 12/31/01	
29	Provide Utilities - Commercial Power and Telephone Service	0 days	Thu 12/27/01	Thu 12/27/01	
30	Install Generator	2 days	Thu 12/27/01	Fri 12/28/01	
31	Final Site Electrical	2 days	Mon 12/31/01	Wed 1/2/02	
32	Install Waveguide Bridge	2 days	Wed 12/19/01	Thu 12/20/01	
33	Install Fencing	4 days	Fri 12/21/01	Mon 12/31/01	
34	Site Restoration	1 day	Wed 1/2/02	Wed 1/2/02	
1	Verify Site Ready	4 days	Thu 1/3/02	Tue 1/8/02	
3	Building Inspection	1 day	Thu 1/3/02	Thu 1/3/02	219
37	Site Ready Audit	1 day	Thu 1/3/02	Thu 1/3/02	

D	APPENDIX B - PRO	Duration	Start	Finish	Predecessors
8	Resolve Punchlist	3 days	Fri 1/4/02	Tue 1/8/02	
3	Site Ready	0 days	Tue 1 8/02	Tue 1/8/02	
40	Davis Lane (Customer Twr & Mot Provided Sheiter)	49 days	Mon 9/24/01	Tue 12/4/01	
41	Construction and Site Ready Work	44 days	Mon 9/24/01	Tue 11/27/01	200
42	Tower Structura Upgrades	0 days	Mon 9/24/01	Mon 9/24/01	
243	FAA Lighting Modifications	0 days	Mon 9/24/01	Mon 9/24/01	
244	Clearl Grade Land	6 days	Tue 9/25/01	Tue 10/2/01	Carlos Comment
245	Dig and Frame Foundation	4 days	Wed 10/3/01	Mon 10/8/01	
246	Pour Foundation	2 days	Tue 10/9/01	Wed 10/10/01	
48	Foundation Cure Install Grounding System for Tower	15 days	Thu 10/11/01	Wed 10/31/01	
249	Set Shelter	0 days	Wed 10/31/01 Thu 11/1/01	Wed 10/31/01 Tue 11/6/01	
250	Install Grounding System for Shelter	4 days 2 days	Wed 11/7/01	Thu 11/8/01	
251	Provide Utilities - Commercial Power and Telephone Service	0 days	Tue 11/6/01	Tue 11/6/01	
252	Install Generator	2 days	Fri 11/9/01	Mon 11/12/01	
253	Final Site Electrical	2 days	Tue 11/13/01	Wed 11/14/01	
54	Instali Waveguide Bridge	2 days	Thu 11/15/01	Fri 11/16/01	
55	Install Fencing	4 days	Mon 11/19/01	Mon 11/26/01	
256	Site Restoration	1 day	Tue 11/27/01	Tue 11/27/01	255
57	Verify Site Ready	5 days	Wed 11/28/01	Tue 12/4/01	100
258	Building Inspection	1 day	Wed 11/28/01	Wed 11/28/01	
259	Site Ready Audit	1 day	Thu 11/29/01	Thu 11/29/01	
260	Resolve Punchlist	3 days	Fri 11/30/01	Tue 12/4/01	
61	Site Ready	0 days	Tue 12/4/01	Tue 12/4/01	257
62	Mount Larson (CustomerBidg/Twr)	14 days	Thu 11/15/01	Thu 12/6/01	
63	Construction and Site Ready Work	10 days	Thu 11/15/01	Mon 12/3/01	WALKE TO S
64	Complete Structural Upgrades	0 days	Mon 12/3/01		261SF-2 days
65	Complete FAA Lighting Modifications	0 days	Mon 12/3/01		261SF-2 days
66	Provide Space for Equipment Provide Space for Cables	0 days	Mon 12/3/01	Mon 12/3/01	2615F-2 days 2615F-2 days
8	Provide Space for Cables Provide Environmental Control	0 days 0 days	Mon 12/3/01 Mon 12/3/01		2615F-2 days
69	Provide Utilities - Commercial Power and Telephone Service	0 days	Mon 12/3/01		2615F-2 days
70	Provide Back-up AC Power/Generator	10 days	Thu 11/15/01		2615F-2 days
71	Complete Electrical Work	0 days	Mon 12/3/01		261SF-2 days
72	Provide AC Surge Protection	0 days	Mon 12/3/01	Mon 12/3/01	2615F-2 days
73	Provide Grounding System for Shelter	0 days	Mon 12/3/01		2615F-2 days
74	Provide Grounding System for Tower	0 days	Mon 12/3/01		261SF-2 days
275	Install Waveguide Endge	0 days	Mon 12/8/01		2615F-2 days
6	Verify Site Ready	4 days	Mon 12/3/01	Thu 12/6/01	
1	Site Ready Audit	1 day	Mon 12/3/01	Mon 12/3/01	263
278	Resolve Punchlist	3 days	Tue 12/4/01	Thu 12/6/01	
279	Site Ready	0 days	Thu 12/6/01	Thu 12/6/01	278
280	Lime Creek (Customer Twr & Mot Provided Shelter)	60 days	Thu 10/11/01	Fri 1/11/02	
81	Construction and Site Ready Work	55 days	Thu 10/11/01	Fri 1/4/02	220
282	Tower Structural Upgrades	0 days	Thu 10/11/01	Thu 10/11/01	
83	FAA Lighting Modifications	0 days	Thu 10/11/01	Thu 10/11/01	
85	Clear/ Grade Land Dig and Frame Foundation	6 days	Fri 10/12/01 Mon 10/29/01	Fri 10/19/01 Thu 11/1/01	204 224
86	Pour Foundation	2 days	Fri 11/2/01	Mon 11/5/01	
87	Foundation Cure	15 days	Tue 11/6/01	Wed 11/28/01	
88	Install Grounding System for Tower	0 days	Wed 11/28/01	Wed 11/28/01	
89	Set Shelter	4 days	Fri 12/7/01	Wed 12/12/01	
90	Install Grounding System for Shelter	2 days	Thu 12/13/01	Fri 12/14/01	
91	Provide Utilities - Commercial Power and Telephone Service	0 days	Wed 12/12/01	Wed 12/12/01	
92	Install Generator	2 days	Mon 12/17/01	Tue 12/18/01	
93	Final Site Electrical	2 days	Wed 12/19/01	Thu 12/20/01	
94	Instail Waveguide Bridge	2 days	Fn 12/21/01	Thu 12/27/01	
95	Install Fencing	4 days	Fri 12/28/01	Thu 1/3/02	
96	Site Restoration	1 day	Fri 1/4/02	Fri 1/4/02	295
97	Verify Site Ready	5 days	Mon 1/7/02	Fri 1/11/02	00.0
98	Building Inspection	1 day	Mon 1/7/02	Mon 1/7/02	A COLOR OF STREET
99	Site Ready Audit	1 day	Tue 1/8/02	Tue 1/8/02	
00	Resolve Punchlist	3 days	Wed 1/9/02	Fri 1/11/02	
01	Site Ready	0 days	Fri 1/11/02	Fri 1/1 1/02	291
03	County Satellite Three (Mot Provided Twr & Shelter) Construction and Site Ready Work	72 days	Wed 10/3/01	Fri 1/18/02	
04	Clear/ Grade Land and Build Road	68 days	Wed 10/3/01	Mon 1/14/02	244
05	Dig and Frame Foundation	12 days 11 days	Wed 10/3/01 Fri 10/19/01	Thu 10/18/01 Fri 11/2/01	
06	Pour Foundation	3 days	Mon 11/5/01	Wed 11/7/01	
07	Foundation Cure	20 days	Thu 11/8/01	Fn 12/7/01	
08	Construct Tower	12 days	Mon 12/10/01	Fri 12/28/01	
09	Notify FAA Tower Construction Complete	0 days	Fri 12/28/01	Fri 12/28/01	
10	Install Grounding System for Tower	3 days	Mon 12/31/01	Thu 1/3/02	
71	Set Shelter	4 days	Mon 12/31/01	Fri 1/4/02	
92	Install Grounding System for Shelter	2 days	Mon 1/7/02	Tue 1/8/02	
13	Provide Utilities - Commercial Power and Telephone Service	0 days	Fri 1/4/02	Fn 1/4/02	
4	Install Generator	2 days	Wed 1/9/02	Thu 1/10/02	
5	Final Site Electrical	2 days	Fn 1/11/02	Mon 1/14/02	
16	Install Waveguide Bridge	2 days	Mon 12/31/01	Wed 1/2/02	308 300

	Took Name	JECT SCHEDU		Emiet	Devinoser
D	Task Name	Duration	Start Thu 1/3/02	Finish Tue 1/8/02	Predecessors
3	Install Fencing Site Restoration	4 days 1 day	Wed 1/9/02	Wed 1/9/02	
19	Verify Site Ready	4 days	Tue 1/15/02	Fri 1/18/02	317
20	Building Inspection	1 day	Tue 1/15/02	Tue 1/15/02	303
21	Site Ready Audit	1 day	Tue 1/15/02	Tue 1/15/02	
2.	Resolve Punchlist	3 days	Wed 1/18/02	Fri 1/18/02	
323	Site Ready	0 days	Fn 1/18/02	Fri 1/18/02	
24	UT Barton Creek (Customer Twr & Mot Provided Shelter)	58 days	Fri 10/19/01	Thu 1/17/02	
125	Construction and Site Ready Work	53 days	Fri 10/19/01	Thu 1/10/02	284
326	Tower Structural Upgrades	0 days	Fri 10/19/01	Fri 10/19/01	7-7-
327	FAA Lighting Modifications	0 days	Fri 10/19/01	Fri 10/19/01	
328	Clear/ Grade Land	6 days	Mon 10/22/01	Mon 10/29/01	
329	Dig and Frame Foundation	4 days	Fri 11/2/01	Wed 11/7/01	328,285
30	Pour Foundation	2 days	Thu 11/8/01	Fri 11/9/01	329,285
331	Foundation Cure	15 days	Mon 11/12/01	Tue 12/4/01	330
332	Install Grounding System for Tower	0 days	Tue 12/4/01	Tue 12/4/01	
333	Set She ter	4 days	Thu 12/13/01	Tue 12/18/01	
334	Install Grounding System for Shelter	2 days	Wed 12/19 01	Thu 12/20/01	
335	Provide Utilities - Commercial Fower and Telephone Service	0 days	Tue 12/18/01	Tue 12/18/01	
336	Install Generator	2 days	Fri 12/21/01	Thu 12/27/01	
37	Final Site Electrical	2 days	Fri 12/28/01	Mon 12/31/01	
38	Install Waveguide Bridge	2 days	Wed 1/2/02	Thu 1/3/02	
39	Install Fencing	4 days	Fri 1/4/02	Wed 1/9/02	
40	Site Restoration	1 day	Thu 1/10 02	Thu 1/10/02	339
41	Verify Site Ready	5 days	Fri 1/11/02	Thu 1/17/02	
42	Building Inspection	1 day	Fri 1/11/02	Fri 1/11/02	
43	Site Ready Audit	1 day	Mon 1/14/02	Mon 1/14/02	
44	Resolve Punchlist	3 days	Tue 1/15/02	Thu 1/17/02	
45	Site Ready	0 days	Thu 1/17/02	Thu 1/17/02	341
46	Creedmoor (Customer Twr & Mot Provided Shelter)	54 days	Thu 10/18/01	Thu 1/10/02	
47	Construction and Site Ready Work	49 days	Thu 10/18/01	Thu 1/3/02	304
48	Tower Structural Upgrades	0 days	Thu 10/18/01	Thu 10/18/01	
49	FAA Lighting Modifications	0 days	Thu 10/18/01	Thu 10/18/01	
350	Clear/ Grade Land	6 days	Fri 10/19/01	Fri 10/26/01	
351	Dig and Frame Foundation	4 days	Mon 11/5/01	Thu 11/8/01	
52	Pour Foundation	2 days	Fri 11/9/01	Mon 11/12/01	
353	Foundation Cure	15 days	Tue 11/13/01	Wed 12/5/01	
3-4	Install Grounding System for Tower	0 days	Wed 12/5/01	Wed 12/5/01	
5	Set She ter	4 days	Thu 12/6/01	Tue 12/11/01	
3	Install Grounding System for Shelter	2 days	Wed 12/12/01	Thu 12/13/01	
557	Provide Utilities - Commercial Power and Telephone Service	0 days	Tue 12/11/01	Tue 12/11/01	
358	Install Generator	2 days	Fri 12/14/01	Mon 12/17/01	
359	Final Site Electrical	2 days	Tue 12/18/01	Wed 12/19/01	
360	Install Waveguide Bridge	2 days	Thu 12/20/01	Fri 12/21/01	
361	Install Fencing	4 days	Thu 12/27/01	Wed 1/2/02	
62	Site Restoration	1 day	Thu 1/3/02	Thu 1/3/02	361
63 64	Verify Site Ready	5 days	Fri 1/4/02	Thu 1/10/02	247
	Building Inspection	1 day	Fn 1/4/02	Fri 1/4/02	
65	Site Ready Audit	1 day	Mon 1/7/02	Mon 1/7/02	
67	Resolve Punchlist	3 days	Tue 1/8/02	Thu 1/10/02	
66	Site Ready Elgin (Customer Twr & Mot Provided Shelter)	0 days	Thu 1/10/02 Mon 10/29/01	Thu 1/10/02 Wed 1/23/02	303
69	Construction and Site Ready Work	56 days 51 days	Mon 10/29/01	Wed 1/15/02	228
70	Tower Structural Upgrades	0 days	Mon 10/29/01	Mon 10/29/01	320
71	FAA Lighting Modifications	0 days	Mon 10/29/01	Mon 10/29/01	
72	Clear/ Grade Land	6 days	Tue 10/30/01	Tue 11/6/01	
73	Dig and Frame Foundation	4 days	Thu 11/8/01	Tue 11/13/01	372 329
74	Pour Foundation	2 days	Wed 11/14/01	Thu 11/15/01	
75	Foundation Cure	15 days	Fri 11/16/01	Mon 12/10/01	
76	Install Grounding System for Tower	0 days	Mon 12/10/01	Mon 12/10/01	
77	Set Sheter	2 days	Wed 12/19/01	Thu 12/20/01	
78	Install Grounding System for Shelter	2 days	Fri 12/21/01	Thu 12/27/01	
79	Provide Utilities - Commercial Power and Telephone Service	0 days	Thu 12/20/01	Thu 12/20/01	
80	Install Generator	4 days	Fn 12/28/01	Thu 1/3/02	
81	Final Site Electrical	2 days	Fn 1/4/02	Mon 1/7/02	
82	Install Waveguide Bridge	2 days	Tue 1/8/02	Wed 1/9/02	
83	Install Fencing	4 days	Tru 1/10/02	Tue 1/15/02	
84	Site Restoration	1 day	Wed 1/16/02	Wed 1/16/02	
85	Verify Site Ready	5 days	Thu 1/17/02	Wed 1/23/02	
86	Building Inspection	1 day	Thu 1/17/02	Thu 1/17/02	
87	Site Ready Audit	1 day	Fri 1/18/02	Fri 1/18/02	
88	Resolve Punchlist	3 days	Mon 1/21/02	Wed 1/23/02	
89	Site Ready	0 days	Wed 1/23/02	Wed 1/23/02	
90	Austrop (Customer Twr & Mot Provided Shelter)	52 days	Fri 10/26/01	Wed 1/16/02	
91	Construction and Site Ready Work	47 days	Fri 10/26/01	Wed 1/9/02	350
92	Tower Structural Upgrades	0 days	Fri 10/26/01	Fn 10/28/01	JJU
			Fri 10/26/01	Fri 10/26/01	
	FAA I Inhting Modifications				
3	FAA Lighting Modifications Clear/ Grade Land	0 days 6 days	Mon 10/29/01	Mon 11/5/01	

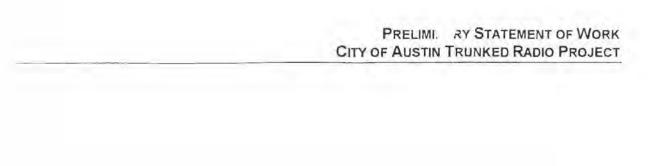
APPENDIX	D	DDC	LECT	CCHEDIN	-
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D	Task Name	Duration	Start	Finisio	Fredecessor
5	Pour Founcation	2 days	Thu 11/15/01	Fri 11/16/01	
L	Foundation Cure	15 days	Mon 11/19/01	Tue 12/11/01	
8	Install Grounding System for Tower	0 days	Tue 12/11/01	Tue 12/11/01	
19	Set Shelter	4 days 2 days	Wed 12/12/01 Tue 12/18/01	Mon 12/17/01 Wed 12/19/01	
01	Install Grounding System for Shelter Provide Utilities - Commercial Power and Telephone Service	0 days	Mon 12/17/01	Mon 12/17 01	
02	Install Generator	2 days	Thu 12/20/01	Fri 12/21/01	
03	Final Site Electrical	2 days	Thu 12/27/01	Fri 12/28/01	
04	Install Waveguide Bridge	2 days	Mon 12/31/01	Wed 1/2/02	
05	Install Fercing	4 days	Thu 1/3/02	Tue 1/8/02	
06	Site Restoration	1 day	Wed 1/9.02	Wed 1/9/02	
107	Verify Site Ready	5 days	Thu 1/10/02	Wed 1/16/02	100
108	Building Inspection	1 day	Thu 1/10/02	Thu 1/10/02	391
09	Site Ready Audit	1 day	Fn 1/11/02	Fri 1/11/02	
10	Resolve Funchlist	3 days	Mon 1/14/02	Wed 1/16/02	409
111	Site Ready	0 days	Wed 1/16/02	Wed 1/16/02	407
112	Cow Creek (Mot Provided Twr & Shelter)	72 days	Wed 11/7/01	Fri 2/22/02	
113	Construction and Site Ready Work	68 days	Wed 11/7/01	Mon 2/18/02	
114	Clear/ Grade Land and Build Road	12 days	Wed 11/7/01	Mon 11/26/01	
115	Dig and Frame Foundation	11 days	Tue 11/27/01	Tue 12/11/01	
116	Pour Foundation	3 days	Wed 12/12/01	Fn 12/14/01	
17	Foundation Cure	20 days	Mon 12/17/01	Thu 1/17/02	
18	Construct Tower	12 days	Fri 1/18/02	Mon 2/4/02	
HE.	Notify FAA Tower Construction Complete	0 days	Mon 2/4/02	Mon 2/4/02	17.11.17
20	Install Grounding System for Tower	3 days	Tue 2/5/02	Thu 2/7/02	
21	Set Shelter	4 days	Tue 2/5/02	Fri 2/8/02	
22	Install Grounding System for Shelter	2 days	Mon 2/11/02	Tue 2/12/02	
23	Provide Utilities - Commercial Power and Telephone Service	0 days	Fri 2/8/02	Fri 2/8/02	
24	Install Generator	2 days	Wed 2/13/02	Thu 2/14/02 Mon 2/18/02	
26	Final Site Electrical Install Waveguide Bridge	2 days 2 days	Fri 2/15/02 Tue 2/5/02	Wed 2/6/02	And the state of t
27	Install Fencing	4 days	Thu 2/7/02	Tue 2/12/02	
28	Site Restoration	1 day	Wed 2/13/02	Wed 2/13/02	
29	Verify Site Ready	4 days	Tue 2/19/02	Fri 2/22/02	421
30	Building Inspection	1 day	Tue 2/19/02	Tue 2/19/02	413
31	Site Ready Audit	1 day	Tue 2/19/02	Tue 2/19/02	
32	Resolve Pun-hist	3 days	Wed 2/20/02	Fri 2/22/02	
133	Site Ready	0 days	Fri 2/22/02	Fri 2/22/02	
4	Hamilton Pool (Mot Provided Twr & Shelter)	72 days	Tue 11/6/01	Thu 2/21/02	-
5	Construction and Site Ready Work	68 days	Tue 11/6/01	Fri 2/15/02	
36	Clear/ Grade Land and Build Road	12 days	Tue 11/6/01	Wed 11/21/01	
137	Dig and Frame Foundation	11 days	Mon 11/26/01	Mon 12/10/01	
138	Pour Foundation	3 days	Tue 12/11/01	Thu 12/13/01	
139	Foundation Cure	20 days	Fri 12/14/01	Wed 1/16/02	
140	Construct Tower	12 days	Thu 1/17/02	Fri 2/1/02	
141	Notify FAA Tower Construction Complete	0 days	Fri 2/1/02	Fri 2/1/02	
142	Install Grounding System for Tower	3 days	Mon 2/4/02	Wed 2/6/02	
143	Set She ter	4 days	Mon 2/4/02	Thu 2/7/02	and the second second
44	Install Grounding System for Shelter	2 days	Fri 2/8/02	Mon 2/11/02	
145	Provide Utilities - Commercial Power and Telephone Service	0 days	Thu 2/7/02	Thu 2/7/02	
46	Install Generator	2 days	Tue 2/12/02	Wed 2/13/02	
48	Final Site Electrical	2 days	Thu 2/14/02 Mon 2/4/02	Fri 2/15/02 Tue 2/5/02	
49	Install Waveguide Bridge Install Fencing	4 days	Wed 2/6/02	Mon 2/11/02	
50	Site Restoration	1 day	Tue 2/12/02	Tue 2/12/02	
51	Verify Site Ready	4 days	Mon 2/18/02	Thu 2/21/02	
52	Building Inspection	1 day	Mon 2/18/02	Mon 2/18/02	435
53	Site Ready Audit	1 day	Mon 2/18/02	Mon 2/18/02	
54	Resolve Punchlist	3 days	Tue 2/19/02	Thu 2/21/02	
55	Site Ready	0 days	Thu 2/21/02	Tru 2/21/02	
56	Round Mountain (Mot Provided Twr & Shelter)	71 days	Wed 11/28/01	Tue 3/12/02	
57	Construction and Site Ready Work	67 days	Wed 11/28/01	Wed 3/6/02	
58	Clear/ Grade Land and Build Road	12 days	Wed 11/28/01	Thu 12/13/01	414FS+1 day
59	Dig and Frame Foundation	11 days	Fri 12/14/01	Thu 1/3 02	
60	Pour Foundation	3 days	Fri 1/4/02	Tue 1/8/02	459,416
61	Foundation Cure	20 days	Wed 1/9/02	Tue 2/5/02	
62	Construct Tower	12 days	Tue 2/5/02	Wed 2/20/02	440,418
63	Notify FAA Tower Construction Complete	0 days	Wed 2/20/02	Wed 2/20/02	
64	Install Grounding System for Tower	3 days	Thu 2/21/02	Mon 2/25/02	
65	Set Shelter	4 days	Thu 2/21/02	Tue 2/26/02	
66	Install Grounding System for Shelter	2 days	Wed 2/27/02	Thu 2/28/02	
67	Provide Utilities - Commercial Power and Telephone Service	0 days	Tue 2/26/02	Tue 2/26/02	
68	Install Generator	2 days	Fri 3/1/02	Mon 3/4/02	
69	Final Site Electrical	2 days	Tue 3/5/02	Wed 3/6/02	
170	Install Waveguide Bridge	2 days	Thu 2/21/02	Fri 2/22/02	
71	Install Fencing	4 days	Mon 2/25/02	Thu 2/28/02	
3	Site Restoration	1 day	Fn 3/1/02	Fri 3/1/02	471
3	Verify Site Ready	4 days	Thu 3/7/02	Tue 3/12/02	1.0
174	Building Inspection	1 day	Thu 3/7/02	Thu 3/7/02	457

	Task Name	Duration	Start	Finish	Predecessors
5	Sile Rearly Audit	1 day	Thu 3/7/02	Tru 3/7/02	
3	Resolve Punchlist	3 days	Fri 3/8/02	Tue 3/12/02	
77	Site Ready	0 days	Tue 3/12/02	Tue 3/12/02	4/3
79	Microwave	276 days	Tue 3/20/01	Wed 4/24/02	
80	Path Surveys	30 days	Tue 3/20/01	Tue 5/1/01	26
ā1	Frequency Coordination	50 days	Wed 5/2/01	Thu 7/12/01	
182	Pre-Installation Work	5 days	Mon 11/19/01	Tue 11/27/01	
183	CECC Temporary Building	10 days	Wed 11/28/01	Tue 12/11/01	482,94
484	Install Antenna System	3 days	Wed 11/28/01	Fri 11/30/01	
485	Install Radio Equipment	7 mays	Mon 12/3/01	Tue 12/11/01	
186	U T RLM Bldg. (E620 & C W RF Site)	10 days	Mon 12/3/01	Fri 12/14/01	
187	Install Antenna System Install Radio Equipment	3 days 7 days	Mon 12/3/01 Thu 12/6/01	Wed 12/5/01	
189	UT Pickle (E620 & CW RF Site)	10 days	Thu 12/6/01	Fri 12/14/01 Wed 12/19/01	
190	Install Antenna System	3 days	Thu 12/6/01	Mon 12/10/01	
191	Install Radio Equipment	7 days	Tue 12/11/01	Wed 12/19/01	
192	Martin Hill (E620 & CW RF Site)	10 days	Tue 12/11/01	Thu 12/27/01	
193	Install Antenna System	3 days	Tue 12/11/01	Thu 12/13/01	
194	Install Radio Equipment	7 days	Fn 12/14/01	Thu 12/27/01	
195	Four Points (E620 & CW RF Site)	10 days	Fri 12/14/01	Wed 1/2/02	
196	Install Antenna System	3 days	Fri 12/14/01	Tue 12/18/01	
98	Install Radio Equipment	7 days	Wed 12/19/01	Wed 1/2/02	
198	Johnny Morris (E620 & CW RF Site) Install Antenna System	10 days 3 days	Fri 12/21/01 Fri 12/21/01	Wed 1/9/02 Fri 12/28/01	
500	Install Radio Equipment	7 days	Mon 12/31/01	Wed 1/9/02	
501	U T Bergstrom (E 620 & CW RF Site)	10 days	Wed 1/9/02	Tue 1/22/02	
502	Install Antenna System	3 days	Wed 1/9/02	Fri 1/11/02	
503	Install Radio Equipment	7 days	Mon 1/14/02	Tue 1/22/02	
504	Davis Lane (E620 & CW RF Site)	10 days	Mon 1/14/02	Fri 1/25/02	240
505	Install Antenna System	3 days	Mon 1/14/02	Wed 1/16/02	
506	Install Radio Equipment	7 days	Thu 1/17/02	Fri 1/25/02	
07	Mt. Larson (E620 & CW RF Site)	10 clays	Thu 1/17/02	Wed 1/30/02	
50B 509	Install Antenna System	3 days	Thu 1/17/02	Mon 1/21/02	
510	Install Radio Equipment Lime Creek (CW RF Site)	7 days 10 days	Tue 1/22/02 Tue 1/22/02	Wed 1/30/02 Mon 2/4/02	
111	Install Antenna System	3 days	Tue 1/22/02	Thu 1/24/02	
512	Instal Radio Equipment	7 days	Fri 1/25/02	Mon 2/4/02	
13	County Satellite Three (CW Site)	10 days	Fri 1/25/02	Thu 2/7/02	
4	Install Antenna System	3 days	Fn 1/25/02	Tue 1/29/02	
515	Install Radio Equipment	7 days	Wed 1/30/02	Thu 2/7/02	514
516	U T Barton Creek (IR RF Site)	10 days	Wed 1/30/02	Tue 2/12/02	
517	Install Antenna System	3 days	Wed 1/30/02	Fn 2/1/02	
518 519	Install Radio Equipment	7 days	Mon 2/4/02	Tue 2/12/02	
520	Creedmoor (IR RF Site)	10 days 3 days	Mon 2/4/02 Mon 2/4/02	Fri 2/15/02 Wed 2/6/02	
21	Install Radio Equirment	7 days	Thu 2/7/02	Fri 2/15/02	
522	Elgin (IR RF Site)	10 days	Thu 2/7/02	Wed 2/20/02	
23	Install Antenna System	3 days	Thu 2/7/02	Mon 2/11/02	
524	Install Radio Equipment	7 days	Tue 2/12/02	Wed 2/20/02	
25	Austrop (IR RF Site)	10 days	Tue 2/12/02	Mon 2/25/02	390
26	Install Antenna System	3 days	Tue 2/12/02	Thu 2/14/02	
27	Install Radio Equipment	7 days	Fri 2/15/02	Mon 2/25/02	
28	Cow Creek (IR RF Site)	10 days	Mon 2/25/02	Fri 3/8/02	
29	Install Antenna System	3 days	Mon 2/25/02	Wed 2/27/02	
30	Install Radio Equipment Hamilton Pool (IR RF Site)	7 days	Thu 2/28/02	Fri 3/8/02 Wed 3/13/02	
32	Install Antenna System	10 days 3 days	Thu 2/28/02 Thu 2/28/02	Mon 3/4/02	
33	Install Radio Equipment	7 days	Tue 3/5/02	Wed 3/13/02	
34	Round Mountain (IR RF Site)	10 days	Wed 3/13/02	Tue 3/26/02	
35	Install Antenna System	3 days	Wed 3/13/02	Fri 3/15/02	
36	Install Radio Equipment	7 days	Mon 3/18/02	Tue 3/26/02	
37	System Optimization	10 days	Wed 3/27/02	Tue 4/9/02	
38	Punchlist Resolution	10 days	Wed 4/10/02	Wed 4/24/02	537
39	Control Matter Leatellet 191		-		
40	Control Station Installations (Phase I Quantity)	7 days	Tue 7/16/02	Thu 7/25/02	500
42	Site ready Preparation Site Ready Audit	0 days	Tue 7/16/02 Wed 7/17/02	Tue 7/16/02 Wed 7/17/02	
43	Delivery of Equipment to Final Locations	1 day	Wed 7/17/02	Wed 7/17/02	
44	Coordinate Site Access for equipment installations	0 days	Wed 7/17/02	Wed 7/17/02	
45	Control Station Equipment Installation (2 per day)	5 days	Thu 7/18/02	Wed 7/24/02	
46	Verify Proper Installation	1 day	Thu 7/25/02	Thu 7/25/02	
47			7.7.7.4	110-124032	1
48	Console Installations	18 days	Tue 7/16/02	Fri 8/9/02	
49	Water & Wastewater (3 Positions) Other (7 Positions)	18 days	Tue 7/16/02	Fri 8/9/02	had-
0=0	Site Ready Preparation	0 days	Tue 7/16/02	Tue 7/16/02	
1 2	Customer Provided Site Connectivity	0 days	Tue 7/16/02	Tue 7/16/02	
	Verify/Test Site connectivity	2 days	Wed 7/17/02	Thu 7/18/02	551

III.		- PROJECT SCHEDU		Flatet	T BANGETON
D	Task Name	Duration	Start Wed 7/24/02	Finish	Predecessors
4	Delivery of Equipment to Final Localions Coordinate Site Access for equipment installations	2 days	The second secon	Thu 1/25/02	
56	Console Equipment Installation	1 day 8 days	Fri 7/26/02 Mon 7/29 02	Fri 7/26/02 Wed 8/7/02	
57	Connect equipment to the building ground system	1 day	Thu 8/8/02	Thu 8/8/02	
58	Verify Proper Installation	1 day	Fn 8/9/02	Fri 8/9/02	
59	Terry Freper Household	, way	THE GOOD	(110/0/02	-01
60	FNE Installation	84 days	Mon 3/18/02	Tue 7/16/02	
61	Inventory Equipment	5 days	Mon 3/18/02	Fri 3/22/02	91
562	CECC Temporary Building	15 days	Mon 3/25/02	Fri 4/12/02	
563	Install FNE Equipment	15 days	Mon 3/25/02	Fri 4/12/02	
364	Mount Larson (E620 & C W RF Site)	19 days	Tue 3/19/02	Fri 4/12/02	262,507
65	Install Antenna System	3 days	Tue 3/19/02	Thu 3/21/02	561FS-4 days, 516
666	Instal FNE Equipment	15 days	Моп 3/25/02	Fri 4/12/02	
567	UT RLM (E620 & CW RF Site)	28 days	Fri 3/22/02	Wed 5/1/02	
68	Install Antenna System	3 days	Fri 3/22/02	Tue 3/26/02	
69	Install FNE Equipment	12 days	Mon 4/15/02	Wed 5/1/02	
70	UT Pickle (E620 & CW RF Site)	25 days	Wed 3/27/02	Wed 5/1/02	
571	Instal Antenna System	3 days	Wed 3/27/02	Fri 3/29/02	
572	Install FNE Equipment	12 days	Mon 4/15/02	Wed 5/1/02	
73	Martin Hill (E620 & CW RF Site)	34 days	Mon 4/1/02	Fri 5/17/02	
74	Install Antenna System	3 days	Mon 4/1/02	Wed 4/3/02	
76	Install FNE Equipment Four Points (E620 & CW RF Site)	12 days 31 days	Thu 5/2/02 Thu 4/4/02	Fri 5/17/02	
77	Install Antenna System	31 days	Thu 4/4/02	Fri 5/17/02 Mon 4/8/02	
78	Install FNE Equipment	12 days	Thu 5/2/02	Fri 5/17/02	
79	Johnny Morris (E620 & CW RF Site)	40 days	Tue 4/9/02	Wed 6/5/02	
80	Install Antenna System	3 days	Tue 4/9/02	Thu 4/11/02	
81	Install FNE Equipment	12 days	Mon 5/20/02	Wed 6/5/02	
82	U T Bergstrom (E 620 & CW RF Site)	37 days	Fri 4/12/02	Wed 6/5/02	
83	Install Antenna System	3 days	Fri 4/12/02	Tue 4/16/02	
84	Install FNE Equipment	12 days	Mon 5/20/02	Wed 6/5/02	
85	Davis Lane (E620 & CW RF Site)	46 days	Wed 4/17/02	Fri 6/21/02	
86	Install Antenna System	3 days	Wed 4/17/02	Mon 4/22/02	
87	Install FNE Equipment	12 days	Thu 6/6/02	Fri 6/21/02	581
BH	Lime Creek (CW RF Site)	41 days	Tue 4/23/02	Wed 6/19/02	280
85	Install Antenna System	3 days	Tue 4/23/02	Thu 4/25/02	
100	Install FNE Equipment	10 days	Thu 6/6/02	Wed 6/19/02	
91	County Satellite Three (CW Site)	50 days	Fri 4/26/02	Mon 7/8/02	
1	Install Antenna System	3 days	Fri 4/26/02	Tue 4/30/02	
5	Install FNE Equipment	10 days	Mon 6/24/02	Mon 7/8/02	
94	U T Barton Creek (IR RF Site)	38 days	Wed 5/1/02	Mon 5/24/02	
95	Install Antenna System	3 days	Wed 5/1/02	Fri 5/3/02	
96 97	Install FNE Equipment	3 days	Thu 6/20/02	Mon 6/24/02	
98	Creedmoor (IR RF Site) Install Antenna System	38 days 3 days	Mon 5/6/02 Mon 5/6/02	Thu 6/27/02 Wed 5/8/02	
99	Install FNE Equipment	3 days	Tue 6/25/02	Thu 6/27/02	
00	Elgin (IR RF Site)	38 days	Thu 5/9/02	Tue 7/2/02	
01	Install Antenna System	3 days	Thu 5/9/02	Mon 5/13/02	
02	Install FNE Equipment	3 days	Fri 6/28/02	Tue 7/2/02	
03	Austrop (IR RF Site)	38 days	Tue 5/14/02	Mon 7/8/02	
04	Install Antenna System	3 days	Tue 5/14/02	Thu 5/16/02	
05	Install FNE Equipment	3 days	Wed 7/3/02	Mon 7/8/02	
06	Cow Creek (IR RF Site)	38 days	Fri 5/17/02	Thu 7/11/02	200
07	instali Antenna System	3 days	Fri 5/17/02	Tue 5/21/02	
808	Install FNE Equipment	3 days	Tue 7/9/02	Thu 7/11/02	
09	Hamilton Pool (IR RF Site)	35 days	Wed 5/22/02	Thu 7/11/02	
10	Install Antenna System	3 days	Wed 5/22/02	Fri 5/24/02	
11	Install FNE Equipment	3 days	Tue 7/9 02	Thu 7/11/02	
12	Round Mountain (IR RF Site)	35 days	Tue 5/28/02	Tue 7/16/02	
13	Install Antenna System	3 days	Tue 5/28/02	Thu 5/30/02	
14	Install FNE Equipment	3 days	Fri 7/12/02	Tue 7/16/02	608
15	2010	74 - Jan 1991			45
115	Optimization	56 days	Thu 6/6/02	Fri 8/23/02	The second secon
17	FNE Site Optimization	36 days	Thu 6/6/02	Fri 7/26/02	
18	CECC Temporary Building	10 days	Thu 6/6/02	Wed 6/19/02	
19	Mount Larson (E620 & C W RF Site)	10 days	Thu 6/6/02	Wed 6/19/02	
20 21	UT RLM (E620 & CW RF Site)	4 days	Thu 6/20/02	Tue 6/25/02	Section of the contract of the
	UT Pickle (E620 & CW RF Site)	4 days	Thu 6/20/02	Tue 6/25/02	
22 23	Martin Hill (E620 & CW RF Site)	4 days	Wed 6/26/02	Mon 7/1/02	
24	Four Points (E620 & CW RF Site)	4 days	Wed 6/26/02	Mon 7/1/02	
25	Johnny Morris (E620 & CW RF Site) U T Bergstrom (E 620 & CW RF Site)	4 days	Tue 7/2/02	Mon 7/8/02	
26	Davis Lane (E620 & CW RF Site)	4 days	Tue 7/2/02 Tue 7/9/02	Mon 7/8/02 Fri 7/12/02	
27	Lime Creek (CWRF Site)	4 days	Tue 7/9/02		
28	County Satellite Three (CW Site)	4 days	Mon 7/15/02	Fri 7/12/02 Thu 7/18/02	
29	U T Barton Creek (IR RF Site)	2 days	Mon 7/15/02	Tue 7/16/02	
7	Creedmoor (IR RF Site)	2 days	Fn 7/19/02	Mon 7/22/02	
	Elgin (IR RF Site)	2 days	Wed 7/17/02	Thu 7/18/02	
	Austrop (IR R- Site)	z uays	Tue 7/23/02	1110 17 10/02	000,020

-		ROJECT SCHEDU		Marie	Dec doubles on
D 13	Task Name Cow Creek (IF AF Site)	Duration	Start Fri 7/19/02	Finish Mon 7/22/02	Predecessors
4	Hamilton Pool (IR RF Site)	2 days	Thu 7/25/02	Fri 7/26/02	and the second s
35	Round Mountain (IR RF Site)	2 days	Tue 7/23/02	Wed 7/24/02	
6	FNE System Optimization	20 days	Mon 7/29/02	Fri 8/23/02	
17	Piec System Optimization	20 days	WOU UZOOZ	111 0120102	017
38	Training	60 days	Tue 9/24/02	Wed 12/18/02	
39	Technical Training	0 days	Wed 12/4/02	Wed 12/4/02	655
10	Provide 4 Sessions of Dispatch Train the Trainer courses.	10 days	Thu 12/5/02	Wad 12/18/02	
11	Provide Dispatch Training for Phase I dispatch personnel.	0 days	Wed 12/18/02	Wed 12/18/02	
42	Provide Subscriber Train the Trainer courses per training plan	10 days	Tue 9/24/02	Mon 10/7/02	
13	Provide Subscriber Training to User Agencies	0 days	Wed 12/18/02	Wed 12/18/02	
4	Trovide Eduscriber Hamiling to Eser Agencies	o days	THOU TENTOL	1700 12 10102	-
5	Initial Subscribers (Water & Wastewater and T.C. Sheriff's Off.)	100 days	Mon 7/29/02	Wed 12/18/02	
16	Program Portable Subscribers (up to 887 units)	40 days	Mon 7/29/02		77FS+60 edays
17	Provide Mobile prototype vehicle for each vehicle type	11 days	Mon 8/19/02		6485S-9 days
8	Install mobile radios for prototypes and get signoif.	10 days	Fri 8/30/02		65055-11 days
9	Customer vehicle coordination p an ready for mobile installation	0 days	Mon 9/16/02		65058-1 day
0	Program and Install Mobile Subscribers (up to 428 units)	65 days	Tue 9/17/02		655FS-55 days,77
1	Deliver Subscribers to Field	10 days	Thu 12/5/02	Wed 12/18/02	
2	Deliver Subscribers to Fled	10 days	1110 12/3/02	9900 12/10/02	040,000
3	Phase   Acceptance Tests	118 days	Mon 8/26/02	Sun 2/16/03	
4	FNE Functional ATP	20 days	Mon 8/26/02	Mon 9/23/02	616
5	Coverage ATP	50 days	Tue 9/24/02	Wed 12/4/02	
6		60 edays	Wed 12/18/02		645,638,655,79
7	60 Day Operational Burn-In Test	ou edays	WEG 12/10/02	Juli 2/10/03	0-10,000,000,78
8	Phase I System Acceptance	67 days	Sun 2/16/03	Wed 5/21/03	
9	Phase I System Acceptance				653
	Resolve punchlist items Prepare System Manual	20 days	Mon 2/17/03	Fri 3/14/03	
0		30 edays 0 days	Sun 2/16/03 Tue 3/18/03	Tue 3/18/03 Tue 3/18/03	
1	Deliver System Manual Final Review Phase I System Manual and Approval				
2		21 edays	Tue 3/18/03	Tue 4/8/03 Wed 5/21/03	
3	Revise and re-submit System Manual	30 days	Wed 4/9/03		
4	Customer Sign Off for Phase I System Acceptance	0 days	Wed 5/21/03	VVEQ 5/21/03	659,660,663
5	T. 90. 0. d. 1. W	M. Abrilla	Com Charles	Dun Millerion	000
6	Transition System to Warranty	0 days	Sun 2/16/03	Sun 2/16/03	653
7					
8	DI II GALDRIAD I D. C.	000 4	ME TAMEION	C.J. AMANINA	450.00 4
9	Phase II - 911-RDMT Radio Project	253 days	Wed 1/15/03		1FS-90 days
0	CECC Preparations for Equipment Move	73 days	Tue 4/22/03	Mon 8/4/03	67000 00 - l
Ţ	Customer Notification that CECC is Ready for Occupancy	0 days	Tue 4/22/03		673SS-30 edays
2	Coordinate Building Access	0 days	Tue 4/22/03	Tue 4/22/03	
3	Site Ready Modifications	50 days	Thu 5/22/03	Fri 8/1/03	
4	Site Ready Audit	1 day	Mon 8/4/03	Mon 8/4/03	673
6	CECC Foodsman Wasse	In dayle	Tue Bising	Mon 8/18/03	
-	CECC Equipment Move	10 days	Tue 8/5/03 Tue 8/5/03	100-11-01-11-0	070
7	Review Cutover Plan	5 days		Mori 8/11/03	
8	Move Equipment to CECC Building	5 days	Tue 8/12/03	Mon 8/18/03	0//
9	District Control of the Control of t	00 4 200	101-1 0100100	W- 4 44/40/00	
0	Phase II Dispatch Consoles	60 days	Wed 8/20/03	Wed 11/12/03	000
1	Install CECC Consoles	60 days	Wed 8/20/03	Wed 11/12/03	
2	Install Remote Consoles	60 days	Wed 8/20/03	Wed 11/12/03	099
3	OC. of U.T. Color	200 4-1-	T 4/00/00	Man 44/47/00	
4	Phase II Training	147 days	Tue 4/22/03	Mon 11/17/03	cocce on adam
5	Notification of Need for Additional Technical Training	0 days	Tue 5/27/03		686SS-90 edays
6	Perform Desired Technical Training	30 days	Mon 8/25/03		701SF-30 days
7	Train the Trainer for Suitscriber Equipment	10 days	Tue 4/22/03		694SS-30 edays
8	Provide Subscriber Training to User Agencies	0 days	Mon 11/17/03	Mon 11/17/03	
9	Train the Trainer for Console Equipment	10 days	Thu 10/2/03		681FS-30 days
0	Provide Console Training to User Agencies	0 days	Mon 11/17/03	Mon 11/17/03	700
1	AVV. 440 M.	040	Mr. d. discound	Man datanean	
2	Agency Add Ons	210 days	Wed 1/15/03	Mon 11/10/03	100 00 . 1
3	Phase II Subscriber Templates Finalized	0 days	Wed 1/15/03		1S5-60 edays
4	Control Stations Installations (2 per day)	120 days	Thu 5/22/03	Mon 11/10/03	
5	Mobiles	120 days	Thu 5/22/03	Mon 11/10/03	
6	Portables	120 days	Thu 5/22/03	Mon 11/10/03	1
7		400		e a same	
8	Phase II Acceptance Tests	102 days	Tue 8/19/03	Fri 1/15/04	676
9	Functional Verification of Site Move Equipment	1 day	Tue 8/19/03	Tue 8/19/03	
0	Console Functional ATP	3 days	Thu 11/13/03	Mon 11/17/03	
1	60 Day Operational Burn-In Test	60 edays	Mon 11/17/03	Fri 1/16/04	680,690,700
2		1 - 7 - 7 - 7	The second second		4
3	Final System Acceptance	65 days	Fri 1/16/04	Mon 4/19/04	
4	Resolve punchlist items	5 days	Mon 1/19/04	Fri 1/23/04	
5	Prepare System Manual	30 edays	Fn 1/16/04	Sun 2/15/04	701
6	Deliver System Manual	0 days	Sun 2/15/04	Sun 2/15/04	705
7	Review Phase II System Manual and Comment	21 odays	5un 2/15/04	Sun 3/7/04	705
_	Revise and re-submit System Manual	30 days	Mon 3/8 04	Mon 4/19/04	
8	Trevise and re-submit bystem manual				



APPENDIX C CHANGE ORDER FORM

# CHANGE ORDER FORM

Project:		
Owner: CITY OF AUSTIN	1	
Contractor:		
Engineer		
Change Order Request No		
PART I CHANGE ORDER	Information	
Requester:	Title:	
Phone no	Department	
DESCRIPTION OF REQUEST: List the additions, modification in the Contract Documents	ations or deletions (circle th	ose that apply) to the work described
ITEM 1# :	I	LUMP SUM AMOUNT:
STATEMENT OF WORK MOI	DIFICATION;	
TIME LINE MODIFICATION:		
JUSTIFICATION:		
PART II CHANGE ORDER	AMOUNT:	
EQUIPMENT:	SERVICES:	TOTAL:
PAYMENT TERMS:		

Unless amended above, all other terms and conditions of the Agreement shall remain in full force and effect.

Part III OVERALL CONTRACT STATUS	
ORIGINAL CONTRACT AMOUNT:	
PREVIOUS NET CHANGE IN CONTRACT AMOUNT:	
NET CHANGE IN CONTRACT TIME:	
REVISED CONTRACT TIME:	
ORIGINAL FINAL COMPLETION DATE:	
REVISED FINAL COMPLETION DATE:	
The compensation and changes agreed upon in this Changustment and final payment for all costs the Contracto this Change Order.	
Agreed and Effective on the last date signed below:	
	Date
Motorola Project Director	
	Date:
Motorola Representative and Title	
	Date:
RDMT Project Manager	0.40%
	Date:
RDMT Project Director	
	Date:
Purchasing	Date



# T1 Specifications

When ordering dedicated T1 transmission media from a common carrier or if the Customer provides links from their private system, the circuit must adhere to the following specifications. The first four specifications contain the information needed by a common carrier. Motorola systems require the remaining specifications for satisfactory operation.

- Availability: In service and usable 99.999% of the time; except during prearranged maintenance periods
- \_ Line Coding: B8ZS
- Signaling: The T1 time slots must be set for "clear channel" operation (no signaling)
- \_ Framing Format: ESF (Extended Superframe)
- Bit Error Rate: 1x10-6
- T1 Network clocking: The carrier should provide a Stratum 2 master clock source
- Propagation Delay: T1 propagation delay between any two sites must be less than 5 milliseconds.
- \_ Compression: None
- Lines should be a dry line (no -48 Volts present).

#### Clocking

All DS-1 line rates must be traceable back to a primary reference source, a common clocking standard with a Stratum Level of 2 or better.

The frame slip rate cannot exceed one frame slip per 6 days.

The clocking standard must have a fail-safe backup to prevent the system from going into a "free running" mode.

The clocking standard must have reverting capabilities. If the primary clock fails, a backup clock takes over operation. When the primary clock returns to service, the system must revert back to the primary clock automatically.

# TI Link Qualification Testing

Motorola will perform a T1 Link Qualification Test on each T1 link prior to optimization in order to determine "Site Ready" conditions. This qualification procedure performs a 15-minute entry test and a 24-hour performance test. The 24-hour performance data is recorded in 1-minute intervals and logged to a file for analysis.

Each T1 analysis will be rated with one of the following:

- T1 circuit passes Motorola T1 performance criteria for item tested and has sufficient margin.
- \* T1 circuit passes Motorola T1 performance criteria for item tested, however, the margin is minimal and steps to improve T1 performance need to be taken.
- T1 circuit failed to meet the Motorola T1 performance criteria and cannot be used to transport network traffic. The issues need to be resolved for this circuit.

Motorola will be responsible for any required T1 performance improvements for all Motorola supplied links. The Customer will be responsible for any required T1 performance improvements for all Customer provided or Customer leased links.

The T1 circuit performance will be analyzed to ensure that all T1 specifications over a 24-hour period. Tests will be obtained using an HP internet advisor network analyzer and HP Digital Tester HP37702A or equivalent products.

#### Four-Wire Connections

Many remote operator console operator positions will require four wire (4W) leased circuits. Specifications on the order of AT and T Type 3002 or Service Type 5 conditioned 4W full duplex lines. The following is a partial list of the Type 3002 specifications:

Insertion Loss @ 1 KHz: 16 dB

Loss Variation @ 1 KHz

Long-term: +/- 4 dB

Short-term: +/- 3 dB

Bandwidth: 2700 Hz (300-3000 Hz)

Frequency Response (ref. 1 KHz)

500-2500 Hz: loss, -2 to +8 dB

300-3000 Hz: loss, -2 to +12 dB

Delay Distortion

800-2600 Hz: 1750 microseconds

Max. Ave. Input Signal Level: 0 dBm at Network Interface

Max. Test Tone Level: 0 dBm at Network Interface

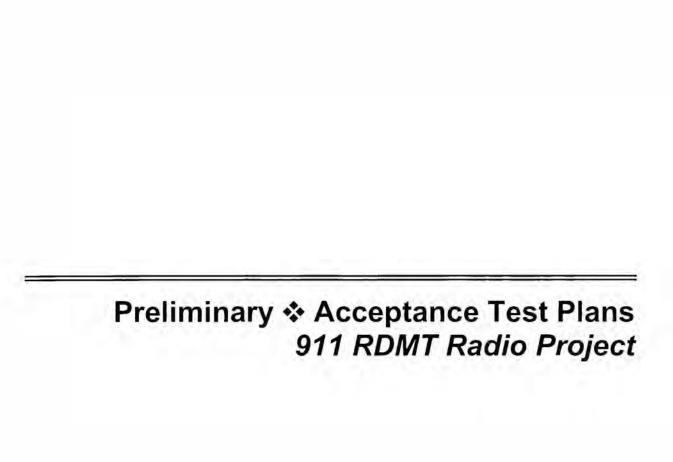
Frequency Shift: +/- 5 Hz

Phase Jitter: less than 10 degrees.

# Circuit Requirements

Termination of the above detailed circuits occurs at the respective demarcation block locations at each equipment site as agreed by the Customer and Motorola. The site/carrier demarcation point should be a 66 (punch-down) block or similar device. Any device that can handle the interface conversion is acceptable.

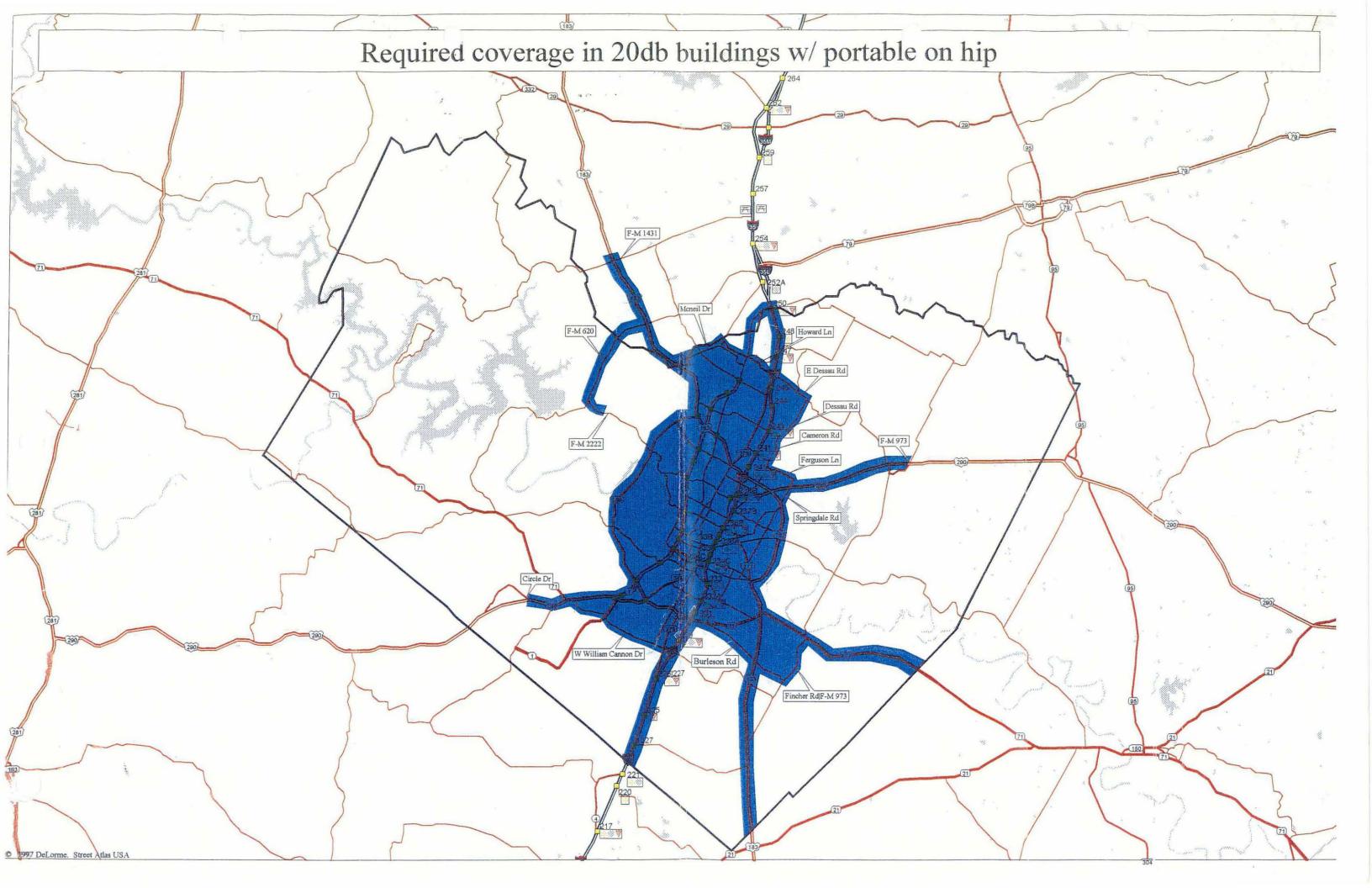
Motorola's Installation Quality Standards, Volume I, R56 Manual provides recommended grounding procedures. Motorola provides a description of the applicability of these procedures for each site.

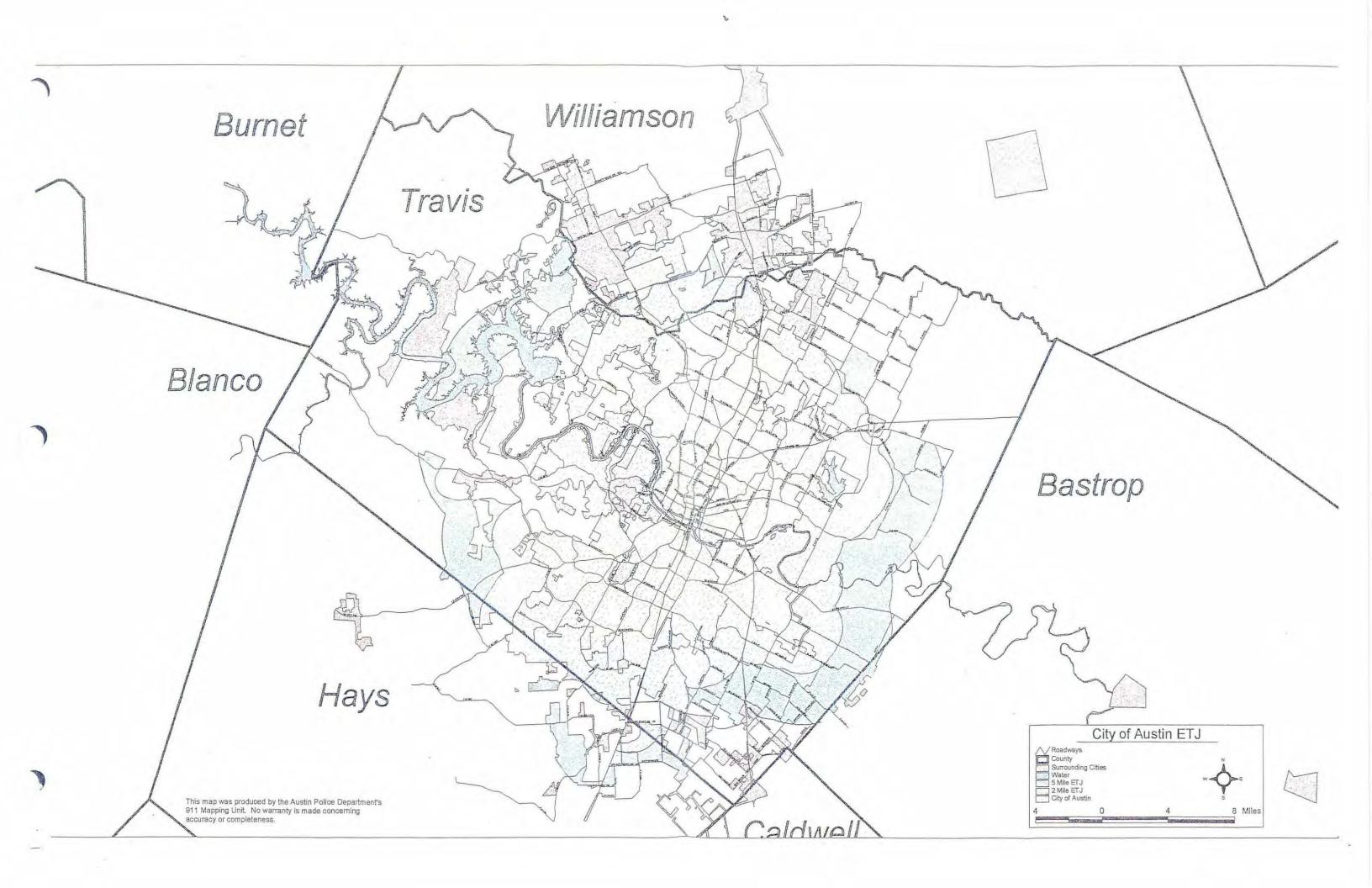


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# Preliminary \* System Description 911 RDMT Radio Project

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# ASTRO™ Simulcast SmartZone Network

Motorola has proposed an ASTRO Simulcast SmartZone Network to provide portable radio coverage throughout Travis County plus the City of Austin five mile ETJ both outdoors and in-buildings. Below is a simplified block diagram depicting each of the subsystems within the proposed ASTRO Simulcast SmartZone Network.

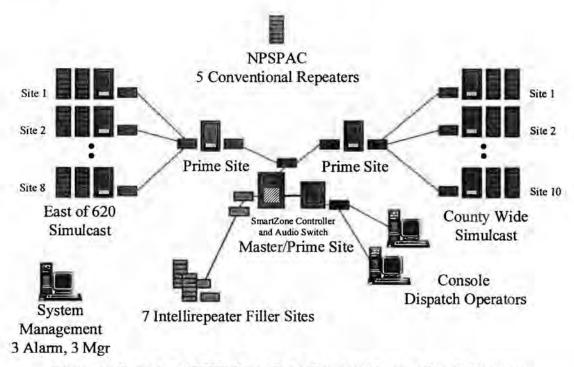


Figure 1: Customer ASTRO SmartZone Simulcast System Block Diagram.

SmartZone transparently links dispatch and field personnel, tracking each radio from site to site and group to group. Radio sites are automatically assigned and connected for wide area calls, allowing a dispatcher or field unit to effortlessly reach another radio - no matter where the person is located in the service area. Right Site™—an exclusive set of features included with Motorola's SmartZone systems—processes calls efficiently, and transparent to system users.

The proposed network supports both analog and digital subscriber units on all channels. The ASTRO user radios can function in both analog and ASTRO digital modes. The radio infrastructure is equipped for encrypted ASTRO communications. The encrypted portion of the system includes Data Encryption Standard - Output Feed Back (DES-OFB) encryption options for all of the Digital Interface Units (DIU) located at the master site.

# Radio Infrastructure OVERVIEW

Motorola proposed two (2) overlaid simulcast systems with IntelliRepeater filler sites for localized, regional fill-in coverage. The countywide simulcast system is a ten (10) site, 24 channel cell. In addition, another simulcast system is overlaid East of 620 and consists of eight (8) sites and 20 channels. This configuration provides 44 channels at sites East of 620 to maximize the number of concurrent conversations county and city-wide. In addition to the two (2) simulcast subsystems, Motorola proposed seven (7) filler sites. These relatively remote or localized regional filler sites are suitable for light field unit traffic. Coverage and Functional Acceptance Testing will be conducted in accordance with the Acceptance Test Plan.

#### The Radio Infrastructure includes:

- One (1) "Master" SmartZone site at Combined Emergency Communications Center (CECC)
- One (1) East 620 Simulcast System with Twenty (20) Channels
  - One (1) "Prime" site at CECC
  - Eight (8) "Remote" sites: Martin Hill, Four Points, Davis Lane, Johnny Morris, Mount Larson, UT Bergstrom, UT Pickle, and UT RLM
- One (1) County Wide Simulcast System with Twenty Four (24) Channels
  - One (1) "Prime" site at Mount Larson
  - Ten (10) "Remote" Sites: Martin Hill, Four Points, Davis Lane, Johnny Morris, Mount Larson, UT Bergstrom, UT Pickle, UT RLM, Lime Creek, and County Satellite Three
- Seven (7) "IntelliRepeater" Filler Sites with Four (4) Channels Each: UT Barton Creek, Cow Creek, Hamilton Pool, Round Mountain, Creedmoor, Elgin, and Austrop
- \* Five (5) NPSPAC Conventional Repeaters at the Mount Larson site

The following figures depict the radio infrastructure sites and subsystems.

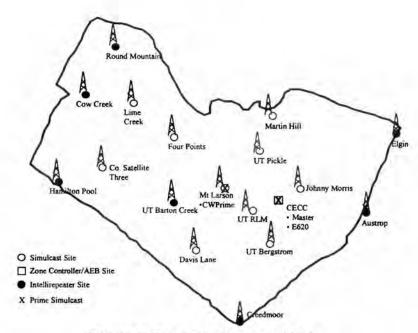


Figure 2: Radio Infrastructure Sites

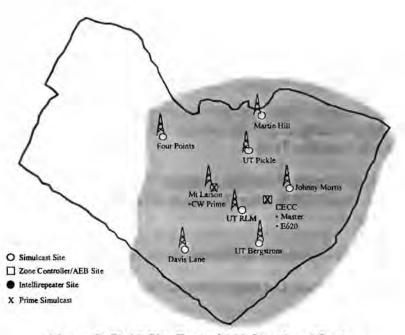


Figure 3: Eight-Site East of 620 Simulcast System.

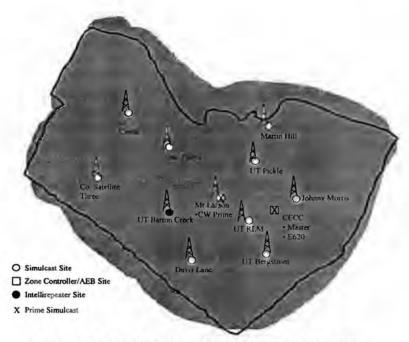


Figure 4: Ten-Site Countywide Simulcast System.

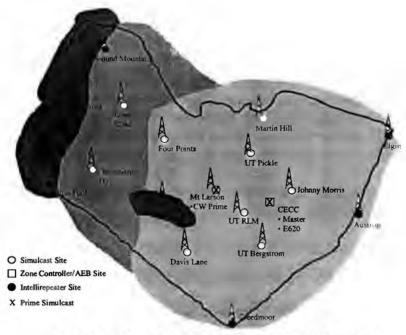


Figure 5: Combined Simulcast and Fill-In System.

The basic building blocks that are integrated in the Customer's system include master site equipment, simulcast system equipment, and IntelliRepeaters.

# Master Site Equipment

The Master Site is the center of control between the subsystems within the radio fixed network. The master controller is a SmartZone controller. Associated with the SmartZone controller at the master site is the Ambassador Electronics Bank (AEB) audio switch, Digital Interface Units (DIUs), and a SmartZone LAN. The SmartZone LAN is closed, and consists of a database server and remote SmartZone manager servers that interface via an ETHERNET LAN to the SmartZone controller. The SmartZone Manager application utilizes Windows based clients. The AEB audio switch connects to the SmartZone controller via redundant RS422 links so that the SmartZone controller can exercise control over the audio routing within the switch to the radio sites and to the console locations.

The ASTRO DIU (Digital Interface Unit) 3000 acts as the encryption, analog, and digital gateway for the console dispatch equipment, and the ASTRO digital trunking system.

#### SmartZone Controller

The center of a Motorola ASTRO SmartZone system is the SmartZone Controller. The SmartZone Controller utilizes the Solaris operating system. The SmartZone Controller proposed for the Customer has the capability to expand to 64 ports. A port is an input/output in the Zone Controller. Typically, a site, and a group of Digital Interface Units each use one port. Note that an entire simulcast subsystem uses just one port, not one port per simulcast remote site. The Customer's controller will be equipped with 16 ports initially and only 15 are required. The SmartZone controller hardware is expandable up to 64 total ports. The ports will be utilized as follows:

- Four (4) Ports for the Prime and Redundant Prime Site Controllers
- Seven (7) Ports for the IntelliRepeater Sites
- Four (4) Ports for the Digital Interface Units (DIU)

The Zone Controller has two (2) primary functions: call processing and resource management. The call processing functions include: receiving call requests, radio site registrations and talkgroup affiliations. The resource management function includes the setup and control of the Audio Switch, as well as management of the database containing information pertaining to all the users, talkgroups and site

information. The Audio Switch connects the correct audio paths under the direction of the Zone Controller.

#### **Audio Switch**

The Ambassador Electronics Bank (AEB) Audio Switch is co-located with the Zone Controller. It ties together the conversations of wide area user groups that are located at multiple sites.

When a call request takes place, the Zone Controller acknowledges the call and sets up a channel at sites where talkgroup members are located. The setup occurs through the data link that exists between the remote sites and the Zone Controller. Simultaneously, the Zone Controller directs the Audio Switch to connect the appropriate sites and channels together to support the wide area conversation. When the conversation is over, the Zone Controller informs the Audio Switch to disconnect existing audio links between sites.

The Audio Switch interfaces with each of the radio subystems and Console Electronics Banks (CEB) through T1 circuits. These circuits can be composed of leased lines, microwave, or even fiber optics as long as the input to the switch is a T1.

# Simulcast System

A simulcast system is designed to simultaneously broadcast identical audio information on the same carrier frequency from multiple, geographically separated sites and vote the received inbound information for retransmission on the network. This means that each site uses the same frequency set to transmit, and another frequency set to receive information from all sites in the network. This greatly improves the efficiency of the system from a frequency-spectrum perspective, and reduces the risk of insufficient resources in an emergency.

#### Simulcast Prime Site

Simulcast Prime Sites include Prime Site Controllers (and associated redundancy hardware), ASTRO-TAC 3000 comparators, trunking distribution equipment, and special channel bank equipment to interface remote simulcast sites to the prime simulcast site via a digital microwave subsystem. The radio infrastructure controllers and support equipment utilize firmware to provide real time audio processing and communications.

In a simulcast network, audio is received at remote simulcast sites through the antenna network and QUANTAR base station receivers. The received audio is sent to the prime site through channel banks for audio processing. The prime site votes the audio from the multiple remote sites. The audio is then sent back out to the remote sites for simulcast transmission. The prime site controller is the center of the simulcast subsystem. Motorola has proposed redundant prime site

controllers which operate in a main/standby manner. Switching between the controllers is accomplished through a TBAR switch. The prime site controllers can support up to 28 channels and 10 sites. The Digital Simulcast Modem in the Telecommunications Network Server (TeNSr) channel bank provides GPS timing as well as superior audio control. The Universal Simulcast Controller Interface embeds low speed data in the audio stream. The ASTRO-TAC 3000 voting comparator extracts the best possible signals from multiple sources and delivers them to single or multiple destinations.

#### Simulcast Remote Sites

Simulcast Remote sites consist of simulcast QUANTAR base stations, a Global Positioning Satellite/Rubidium (GPS/RB) frequency standard, a Remote Site Controller, and TeNSr channel bank equipment.

The Motorola QUANTAR base stations provide a modular, flexible station design for today's communications systems and those of the future. The trunking stations will be equipped with 100 watt transmitters, GPS simulcast, ASTRO digital and analog operation, and will be mounted in 7 ½' open face racks.

Antenna systems and power backup systems are provided as detailed in the antenna and power sections of the system description.

# IntelliRepeater System

An IntelliRepeater system is single site trunk system that consists of a group of base stations with intelligence in the repeater so that a controller is not needed. Each IntelliRepeater has the capability of communicating with the Zone Controller and directing activity at the remote site. The IntelliRepeater configuration allows for a fully fault tolerant remote site. The failure of one repeater (even the one acting as the controller) does not impact the features available at that site. Full trunking features are retained even in the event of a failure. This greatly increases the safety of your radio users by ensuring continued communications.

# RADIO INFRASTRUCTURE EQUIPMENT BY SITE

# CECC Master Site and East 620 Simulcast Prime Site

The Combined Emergency Communications Center (CECC) will contain all of the "master" equipment and the "prime" equipment for the East 620 simulcast subsystem. As the master and East 620 simulcast prime site, this building will need to house many different components of the infrastructure.

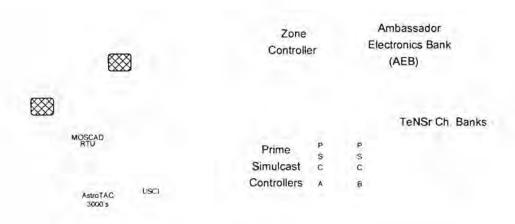


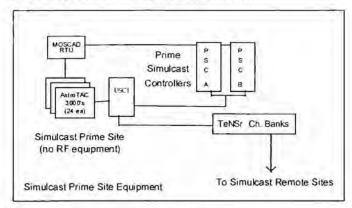
Figure 6: CECC Master and East 620 Prime Site Block Diagram

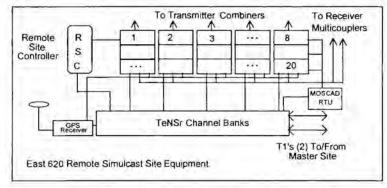
Major equipment items that will be located at the CECC Master and E620 Prime Site are:

- One (1) SmartZone Zone Controller
- One (1) Zone Controller Database Server
- Zone Controller User Servers
- One (1) Ambassador Electronics Bank (AEB)
- Fifteen (15) TeNSr Channel Banks
- Two (2) Prime Simulcast Controllers (Main and redundant)
- One (1) GPS Rubidium Standard
- Twenty (20) ASTRO-TAC 3000 Comparators
- Sixty Three (63) Digital Interface Units (DIU)
- Twenty (20) Universal Simulcast Controllers (USCI)
- One (1) MOSCAD Alarm Server
- MOSCAD Alarm Master, and Alarm Remotes

# Mount Larson County Wide Simulcast Prime Site and Remote Simulcast Sites

The Mount Larson site will be a simulcast "prime" site for the County Wide simulcast subsystem as well as a remote simulcast repeater site for both the East 620 and County Wide Simulcast networks.





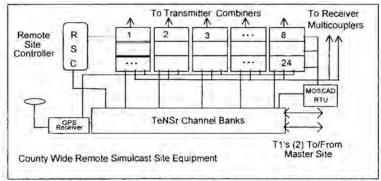


Figure 7: Mount Larson County Wide Prime and Remote Simulcast Site Block Diagram

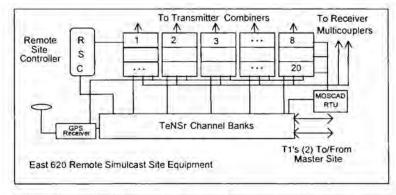
Major equipment that will be located at the Mount Larson County Wide Prime Site with Simulcast Remotes include the following:

- Twenty Three (23) TeNSr Channel Banks
- Two (2) Prime Simulcast Controllers (Main and redundant)
- Twenty Four (24) ASTRO-TAC 3000 Comparators

- Twenty Four (24) Universal Simulcast Controllers
- \* Two (2) Remote Site Controller
- Forty Four (44) QUANTAR Simulcast Repeaters
- · One (1) GPS and Rubidium Standard
- Five (5) Transmit and Two (2) receive antenna networks
- MOSCAD Alarm Remotes
- 48 VDC Power System
- Five (5) NPSPAC Conventional Repeaters

#### Simulcast Remote Sites

There are two (2) simulcast subsystems, one system has eight (8) sites East of 620. The other county wide system has the same eight (8) sites East of 620 as well as an additional two (2) sites in western Travis County for a total of ten (10) sites in the County Wide Simulcast system. The overlaid simulcast systems provide 44 channels East of 620 and 24 Channels County Wide. The 44 channel sites include Martin Hill, Four Points, Davis Lane, Johnny Morris, UT Bergstrom, UT Pickle, Mount Larson, and UT RLM (note: Mount Larson is the County Wide Prime Site). The 24 channel sites include Lime Creek and County Satellite Three.



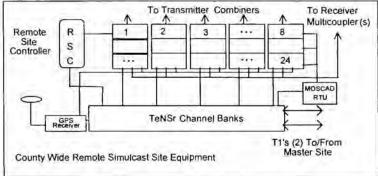


Figure 8: Remote Simulcast Site Block Diagram

Major equipment provided by Motorola that will be located at the Remote

#### Simulcast Sites include:

- Three (3) TeNSr Channel Banks at 44 channel sites
- Two (2) TeNSr Channel Banks at 24 channel sites
- Two (2) Remote Simulcast Controllers at 44 Channel Sites
- One (1) Remote Simulcast Controllers at 24 Channel Sites
- 24 or 44 QUANTAR Repeaters
- Five (5) transmit and two (2) receive antenna networks at 44 channel sites
- Three (3) transmit and one (1) receive antenna networks at 24 channel sites
- One (1) GPS and Rubidium Standard
- One (1) AC Transient Surge Protection, main panel protector
- MOSCAD Alarm Remotes
- 48 VDC Power System
- Generator and transfer panel
- Equipment Shelters for Martin Hill, Four Points, Davis Lane, Johnny Morris, UT Bergstrom, UT Pickle, Lime Creek, and County Satellite Three
- Towers for Johnny Morris, UT Bergstrom, and County Satellite Three

# IntelliRepeater Sites

The IntelliRepeater sites include UT Barton Creek, Cow Creek, Hamilton Pool, Round Mountain, Creedmoor, Elgin, and Austrop. An IntelliRepeater site will house a remote SmartZone filler site.

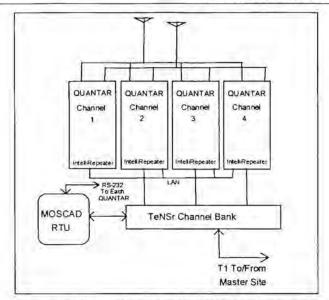


Figure 9: IntelliRepeater Site Block Diagram

Major equipment items provided by Motorola that will be located at IntelliRepeater Sites include:

- Four (4) QUANTAR IntelliRepeater Trunking Stations
- One (1) TeNSr Channel Bank
- One (1) Transmit and One (1) Receive Antenna Network
- One (1) AC Transient Surge Protection, main panel protector
- One (1) MOSCAD Alarm Remote Terminal Unit (RTU)
- · Generator and transfer panel
- 48 VDC Power System
- Towers for Cow Creek, Hamilton Pool, and Round Mountain
- Equipment Shelters for UT Barton Creek, Cow Creek, Hamilton Pool, Round Mountain, Creedmoor, Elgin, and Austrop

# **BACKUP POWER SYSTEMS**

# 48 VDC Transmitter Site Backup Power

Motorola's proposal includes 48 VDC backup power systems for all trunking system transmitter sites. Each transmitter site will have a DC power system sized

to handle the load for two (2) hours. The 48VDC power systems have been sized to accommodate the proposed equipment (no growth). Motorola has included one additional rectifier for each site so if there is a single rectifier failure, the remaining chargers are still capable of providing 100% of the necessary power for "N+1" redundancy. The repeaters were assumed to have a 100% transmit duty cycle.

Table 1: 48 VDC Power System

Site	Battery Bank Size (AH) 2 Hours	Charger Capacity (Amps) 2 Hours	# of Relay Racks (Not Including Batteries	# of DC to AC Inverters	Capacity of Each Inverters (VA)
Master Site					
CECC		Custome	provided bac	kup power	
Main Repeater Site	es				
Martin Hill	1400	600	2	2	1000
Four Points	1400	600	2	2	1000
Davis Lane	1400	600	2	2	1000
Johnny Morris	1400	600	2	2	1000
Mount Larson	1700	750	4	4	1000
UT RLM	1400	600	2	2	1000
UT Bergstrom	1400	600	2	2	1000
UT Pickle	1400	600	2	2	1000
County Satellite Three	790	350	1	1	1000
Lime Creek	790	350	1	1	1000
IntelliRepeater Site	es				
Cow Creek	350	200	1	Ť	500
Hamilton Pool	350	200	1	1	500
UT Barton Creek	350	200	1	1	500
Austrop	350	200	1	1	500
Round Mountain	350	200	1	1	500
Créedmoor	350	200	1	1	500
Elgin	350	200	1	130	500

#### **AC Power Generators**

The remote simulcast sites have been sized to support the proposed equipment plus 20% growth. The repeaters were assumed to have a 100% transmit duty cycle.

Table 2: Generators

Site	Size (KW)	Model	Fuel Type	Run Time Per Fueling (Hours)					
CECC	100		Provided						
Mount Larson	175	DGFB	336	26					
Martin Hill	125	DGEA	336	34					
Four Points	125	DGEA	336	34					
Davis Lane	125	DGEA	336	34					
Johnny Morris	125	DGEA	336	34					
UT RLM	CUSTOMER PROVIDED								
UT Bergstrom	125	DGEA	336	34					
UT Pickle	125	DGEA	336	34					
County Satellite Three	125	DGEA	336	34					
Lime Creek	125	DGEA	336	34					
Cow Creek	40	DGBC	140	40					
Hamilton Pool	40	DGBC	140	40					
UT Barton Creek	40	DGBC	140	40					
Round Mountain	40	DGBC	140	40					
Creedmoor	40	DGBC	140	40					
Austrop	40	DGBC	140	40					
Elgin	40	DGBC	140	40					

#### RADIO INFRASTRUCTURE SITES

# Transmitter Sites and Antenna Systems

Below is a summary of the proposed antenna systems by site.

Table 3: Transmitter Sites and Antenna Systems

Site	Lat	Long	Tower Top Amp and 3/8" Line		RX Ant Type and 7/8" LDF		TX Ant Type and 1- 1/4" LDF	Elevation (ft)	Tower (ft)	EI+TW (ft)	Type of Site
Martin Hill	30 27 30	97 42 05	2	2	Celwave BMR120	5	Celwave 10017	925	300	1225	E620 /CW
Four Points	30 23 26	97 50 38	2	2	Celwave 10017	5	Celwave 10017	1086	300	1386	E620 /CW
Davis Lane	30 11 41	97 50 24	2	2	Celwave BMR120	5	Celwave 10017	850	300	1150	E620 /CW
Johnny Morris	30 19 36	97 37 34	2	2	Celwave BMR120	5	Celwave 10017	652	390	1042	E620 /CW
Mount Larson	30 18 32	97 47 37	2	2	Celwave BMR120	5	Celwave 10017	889	500	1389	E620 /CW
UT RLM	30 17 19	97 44 13	2	2	Celwave BMR120	5	Celwave 10017	600	168	768	E620 /CW
UT Bergstrom	30 13 09	97 42 38	2	2	Celwave BMR120	5	Celwave 10017	600	200	800	E620 /CW
UT Pickle	30 23 30	97 43 20	2	2	Celwave BMR120	5	Celwave 10017	788	319	1107	E620 /CW
County Satellite Three	30 17 38	98 00 58	1	4	Celwave BMR120	3	Celwave 10017	1184	450	1634	County Wide

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Lime Creek	30 29 17	97 53 22	14	1	Celwave BMR120	3	Celwave 10017	1000	549	1549	County Wide
Cow Creek	30 31 46	98 03 05	i de Maria	1	Decibel DB812	1	Decibel DB812	1025	400	1425	Intelli
UT Barton Creek	30 18 51	97 51 58	1	1	Decibel DB812	1	Decibel DB812	977	500	1477	Intelli
Hamilton Pool	30 20 23	98 06 47	1	1	Decibel DB812	1	Decibel DB812	1150	300	1450	Intelli
Round Mountain	30 34 26	97 59 33	1	1	Decibel DB812	1	Decibel DB812	1260	250	1510	Intelli
Elgin	30 25 00	97 21 32	1	1	Decibel DB812	1	Decibel DB812	574	297	871	Intelli
Austrop	30 15 03	97 29 13	1	1	Decibel DB812	1	Decibel DB812	548	97	645	Intelli
Creedmoor	30 03 19	97 45 01	1	1	Decibel DB812KSC- XT, 45 az	1	Decibel DB812KSC- XT, 45 az	748	298	1046	Intelli

Transmission lines at the radio infrastruction sites will have PolyPhaser Corporation's Impulse Supressor family of coaxial protectors. The transmit lines utilize an IS-CT50HN series coaxial protector. The receive lines utilize an IS-DC50LNZ "DC Pickor" series coaxial protector.

The Celwave WIJD860 series combiner has been proposed. The Motorola TDF7816 tower top amplifier and multicoupler system with 24 ports has been proposed, and it is expandable to 96 ports.

# Equipment Space, Shelters, and Towers

Remote simulcast sites with 48 channels require space for at least twenty (20) equipment racks, 2ft wide X 7 ½ feet tall. Prime Simulcast sites require space for at least 15, 2 ft wide X 7 ½ feet tall equipment racks. The SmartZone Master Site requires space for at least 25 equipment racks, 2 ft wide X 7 ½ feet tall. IntelliRepeater sites require space for at least four (4)equipment racks, 2 ft wide X 7 ½ feet tall. The number of required racks may vary based upon approved rack face drawings which will be completed during the Detailed Design Review.

Motorola provided shelters at remote simulcast sites are 15' W x 33' L x 9' H equipment shelters (space for 30 racks of equipment, depending upon layout) with a 11' W x 17' L x 9' H generator shelter. Therefore, Remote simulcast shelters have been sized to support the estimated 20 racks of equipment as well as space for 10 racks of expansion.

Motorola provided shelters at IntelliRepeater sites are 12' W x 34 □ L x 9' H shelters to house twelve (12) equipment racks and generator. Therefore, the IntelliRepeater sites have space for the four (4) requiredequipment racks as well as eight (8)equipment racks for expansion.

**Table 4: Equipment Shelters** 

Site	Equipment Shelter Size	Generator Shelter Size	Shelter Space for Equipment Racks	Minimum Racks for Radio Equipment	Rack Space for Expansion
Master Site					
CECC	Customer Provided	Customer Provided	N/A	60	N/A
Main Repeater Sites					
Martin Hill	15' W x 33' L x 9' H	11' W x 17' L x 9' H	30	20	10
Four Points	15' W x 33' L x 9' H	11' W x 17' L x 9' H	30	20	10
Davis Lane	15' W x 33' L x 9' H	11' W x 17' L x 9' H	30	20	10
Johnny Morris	15' W x 33' L x 9' H	11' W x 17' L x 9' H	30	20	10
Mount Larson	Customer Provided	Customer Provided	N/A	36	N/A
UT RLM	Customer Provided	Gustomer Provided	N/A	20	N/A
UT Bergstrom	15' W x 33' L x 9' H	11' W x 17" L x 9' H	30	20	10
UT Pickle	15' W x 33' L x 9' H	11' W x 17" L x 9' H	30	20	10
County Satellite Three	15' W x 33' L x 9' H	11' W x 17' L x 9' H	30	12	18
Lime Creek	15' W x 33' L x 9' H	11' W x 17' L x 9' H	30	12	18
Intellirepeater Sites					
Cow Creek	12' W x 34□ L x 9' H	generator in equipment shelter	12	4	8
Hamilton Pool	12' W x 34□ L x 9' H	generator in equipment shelter	12	4	8
Round Mountain	12' W x 34□ L x 9' H	generator in equipment shelter	12	4	8
Barton Creek	12' W x 34□ L x 9' H	generator in equipment shelter	12	4	8
Austrop	12' W x 34□ L x 9' H	generator in equipment shelter	12	4	8
Creedmoor	12' W x 34□ L x 9' H	generator in equipment shelter	12	4	8
Elgin	12' W x 34□ L x 9' H	generator in equipment shelter	12	4	8

Motorola's proposal includes quotes for six (6) new communications towers. The towers are sized to support fourteen (14) Celwave BMR 12-O antennas and four (4) 6 ft. microwave dishes. The following sites will have new towers constructed:

Table 5: New Towers

Site	Height		
J T Bergstrom	200' Guyed		
Round Mountain	250' Guyed		
amilton Pool	300' Guyed		
ohnny Morris	390' Guyed		
Cow Creek	400' Guyed		
County Satellite Three	450' Guyed		

## Inter-Site Communications

The site connectivity is currently under review by the Customer. Once a final determination is made, the inter-site communications can be finalized. The Harris solution is Motorola's primary offering, and the Nortel solution is Motorola's secondary and conditional offering. Motorola's Proposal regarding the microwave radio system is premised solely upon the primary offering and the use of Harris as the microwave subcontractor. Motorola's responses and indications of compliance, clarifications, and or exceptions are valid only concerning the primary offering.

Section 8 of the Request for Proposal detailed the Customer's site connectivity needs. Below is a summary of site connectivity.

- Motorola Provided SONET Loop Microwave for Simulcast Sites
- Motorola Provided Spur Hops to Western and Eastern IntelliRepeaters Filler Sites
- Six (6) Customer Provided T1s or Ethernet links from CECC Temporary
  Facility to Three (3) System Management Locations (Potentially none
  required due to co-location of System Management at the CECC, two T1s per
  location)
- Customer Provided Circuits for Console Locations (note: not required for operator positions located at CECC)

## SITE CONNECTIVITY PLAN

Below is the PRELIMINARY site connectivity plan. The plan contains the provider, type of circuit, and end points for each location.

Table 6: Site Connectivity Plan

No.	Loop Spur	DS 3	T-1	Link Type	Site From	Site To	Usage	Provider
SITE	LINKS TO	MASTER						
1	L	1	1	T1	CECC	Mount Larson	System 1 to Master	Motorola uW
2	L	1	2	Ti	CECC	Mount Larson	System 1 to Master	Motorola uW
3	L&S	1	3	T1	CECC	Cow Creek	IR Site to Master	Motorola uW
4	L&S	1	4	T1	CECC	Cow Creek	IR Site to Master (reserved for future)	Motorola uW
5	L&S	1	5	T1	CECC	Hamilton Pool	IR Site to Master	Motorola uW
6	L&S	1	6	T1	CECC	Hamilton Pool	IR Site to Master (reserved for future)	Motorola uW
7	L&S	1	7	T1	CECC	Barton Creek	IR Site to Master	Motorola uW
8	L&S	1	8	T1	CECC	Barton Creek	IR Site to Master (reserved for future)	Motorola uW
9	L&S	1	9	Т1	CECC	Round Mountain	IR Site to Master	Motorola uW
10	L&S	1	10	T1	CECC	Round Mountain	IR Site to Master (reserved for future)	Motorola uW
55	L&S	3	TBD	T1	CECC	Elgin	IR Site to Master	Motorola uW
56	L&S	3	TBD	T1	CECC	Elgin	IR Site to Master (reserved for future)	Motorola uW
57	L&S	3	TBD	T1	CECC	Creedmoor	IR Site to Master	Motorola uW
58	L&S	3	TBD	Ť1	CECC	Creedmoor	IR Site to Master (reserved for future)	Motorola uW
59	L&S	3	TBD	T1	CECC	Austrop	IR Site to Master	Motorola uW
60	L&S	3	TBD	T1	CECC	Austrop	IR Site to Master (reserved for future)	Motorola uW
SIMU	LCAST T-1							
11	L	1.	11	T1	Mount Larson	Johnny Morris	System 1 Odd Channels	Motorola uW
12	L	1	12	Ti	Mount Larson	Johnny Morris	System 1 Even Channels	Motorola uW
13	L.	1.	13	T1	Mount Larson	UT RLM	System 1 Odd Channels	Motorola uW
14	L	t i	14	T1	Mount Larson	UT RLM	System 1 Even Channels	Motorola uW
15	L	1.	15	T1	Mount Larson	UT Pickle	System 1 Odd Channels	Motorola uW
16	L	1	16	T1	Mount	UT Pickle	System 1 Even	Motorola uW

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No.	Loop Spur	DS 3	T-1	Link Type	Site From	Site To	Usage	Provider
					Larson		Channels	
17	L	1	17	T1	Mount Larson	Martin Hill	System 1 Odd Channels	Motorola uW
18	L	1	18	T1	Mount Larson	Martin Hill	System 1 Even Channels	Motorola uW
19	L	1	19	T1	Mount Larson	Four Points	System 1 Odd Channels	Motorola uW
20	L	1	20	T1	Mount Larson	Four Points	System 1 Even Channels	Motorola uW
21	C.	1	21	T1	Mount Larson	Lime Creek	System 1 Odd Channels	Motorola uW
22	Ľ	1	22	T1	Mount Larson	Lime Creek	System 1 Even Channels	Motorola uW
23	L	1	23	T1	Mount Larson	County Satellite Three	System 1 Odd Channels	Motorola uW
24	<b>b</b> .*	1	24	T1	Mount Larson	County Satellite Three	System 1 Even Channels	Motorola uW
25	L	1	25	T1	Mount Larson	Davis Lane	System 1 Odd Channels	Motorola uW
26	L	1	26	T1	Mount Larson	Davis Lane	System 1 Even Channels	Motorola uW
27	Ĺ	1	27	T1	Mount Larson	UT Bergstrom	System 1 Odd Channels	Motorola uW
28	L	1	28	<b>T1</b>	Mount Larson	UT Bergstrom	System 1 Even Channels	Motorola uW
29	Ĺ	2	1	T1	CECC	Johnny Morris	System 2 Odd Channels	Motorola uW
30	L	2	2	T1	CECC	Johnny Morris	System 2 Even Channels	Motorola uW
31	L	2	3	T1	CECC	UT RLM	System 2 Odd Channels	Motorola uW
32	L	2	4	T1	CECC	UT RLM	System 2 Even Channels	Motorola uW
33	L	2	5	T1	CECC	UT Pickle	System 2 Odd Channels	Motorola uW
34	L	2	6	T1	CECC	UT Pickle	System 2 Even Channels	Motorola uW
35	L	2	7	T1.	CECC	Martin Hill	System 2 Odd Channels	Motorola uW
36	L	2	8	T1	CECC	Martin Hill	System 2 Even Channels	Motorola uW
37	L	2	9	Ť1	CECC	Four Points	System 2 Odd Channels	Motorola uW
38	L	2	10	T1	CECC	Four Points	System 2 Even Channels	Motorola uW
39	L	2	11	T1	CECC	Mount Larson	System 2 Odd Channels	Motorola uW

No.	Loop Spur	DS 3	T-1	Link Type	Site From	Site To	Usage	Provider
40	L	2	12	T1	CECC	Mount Larson	System 2 Even Channels	Motorola uW
41	L	2	13	T1	CECC	Davis Lane	System 2 Odd Channels	Motorola uW
42	L	2	14	T1	CECC	Davis Lane	System 2 Even Channels	Motorola uW
43	L	2	15	T1.	CECC	UT Bergstrom	System 2 Odd Channels	Motorola uW
44	L	2	16	T1	CECC	UT Bergstrom	System 2 Even Channels	Motorola uW
CON	/ENTIONA	L CHANN	NELS a	nd FUTURE				
45	L	2	17	T1	CECC	Johnny Morris	(Reserved for future)	Motorola uW
46	L	2	18	T1	CECC	UT RLM	(Reserved for future)	Motorola uW
47	L	2	19	T1	CECC	UT Pickle	(Reserved for future)	Motorola uW
48	L	2	20	T1	CECC	Martin Hill	(Reserved for future)	Motorola uW
49	L	2	21	T1	CECC	Four Points	(Reserved for future)	Motorola uW
50	L	2	22	T1	CECC	Lime Creek	(Reserved for future)	Motorola uW
51	F	2	23	T1	CECC	County Satellite Three	(Reserved for future)	Motorola uW
52	L.	2	24	T1	CECC	Mount Larson	Conventional Channels (NPSPAC)	Motorola uW
	E	2	25	T1	CECC	Davis Lane	(Reserved for future)	Motorola uW
53	_							

CECC = Combined Emergency Communications Center

System 1 = County Wide

System 2 = E620 (Austin City)

### RADIO INFRASTRUCTURE CONNECTIVITY

Radio infrastructure sites require T1 connectivity between Motorola provided Telecommunications Network Server (TeNSr) Channel banks. The detailed specifications for the T1 circuits are contained in an appendix to the Statement of Work. The details of the required T1s are contained in the site connectivity plan.

## System Management Subsystem USER EQUIPMENT

Motorola's SmartZone Manager and MOSCAD Alarm and Control provide user access points to control and manage the system. A total of 3 SmartZone Manager Terminals and 3 MOSCAD alarm and control terminals have been

proposed. The SmartZone Manager application software utilizes Windows based clients. The MOSCAD alarm and control network utilizes In-Touch application software on a Windows NT computer.

## MOSCAD ALARM AND CONTROL SYSTEM

Motorola is proposing MOSCAD, a network fault management (alarm and control) system to monitor and display system operation. The following table lists the locations and alarm and control equipment located at each site.

Table 7: Locations and Quantities - Fault Management Equipment

Location	Network Fault Management Equipment			
CECC	Master Server, User Terminal			
CECC	RTU with Interfaces to DIU, Master Equipment, Comparators, Central Controller, GPS Receiver, Channel Banks, Site Alarms, and Microwave Alarm System			
UT RLM Building	RTU with Interfaces to DIU, Controller, GPS Receiver, Repeaters, Channel Banks, Site Alarms, and Microwave Alarm System			
Johnny Morris	RTU with Interfaces to Remote Site Controller, GPS Receiver, Repeaters, Channel Banks, Site Alarms, and Microwave Alarm System			
UT Pickle	RTU with Interfaces to Remote Site Controller, GPS Receiver, Repeaters, Channel Banks, Site Alarms, and Microwave Alarm System			
Martin Hill	RTU with Interfaces to Remote Site Controller, GPS Receiver, Repeaters, Channel Banks, Site Alarms, and Microwave Alarm System			
Four Points	RTU with Interfaces to Remote Site Controller, GPS Receiver, Repeaters, Channel Banks, Site Alarms, and Microwave Alarm System			
Mount Larson	RTU with Interfaces to Remote Site Controller, GPS Receiver, Repeaters, Channel Banks, Site Alarms, and Microwave Alarm System			
County Satellite Three	RTU with Interfaces to Remote Site Controller, GPS Receiver, Repeaters, Channel Banks, Site Alarms, and Microwave Alarm System			
Davis Lane	RTU with Interfaces to Remote Site Controller, GPS Receiver, Repeaters, Channel Banks, Site Alarms, and Microwave Alarm System			
UT Bergstrom	RTU with Interfaces to Remote Site Controller, GPS Receiver, Repeaters, Channel Banks, Site Alarms, and Microwave Alarm System			
Lime Creek	RTU with Interfaces to Remote Site Controller, GPS Receiver, Repeaters, Channel Banks, Site Alarms, and Microwave Alarm System			
UT Barton Creek	RTU with Interfaces to Repeaters, Channel Banks, Site Alarms, and Microwave Alarm System			
Cow Creek	RTU with Interfaces to Repeaters, Channel Banks, Site Alarms, and Microwave Alarm System			
Round Mountain	RTU with Interfaces to Repeaters, Channel Banks, Site Alarms,			

Location	Network Fault Management Equipment		
	and Microwave Alarm System		
Hamilton Pool	RTU with Interfaces to Repeaters, Channel Banks, Site Alarms, and Microwave Alarm System		
Austrop	RTU with Interfaces to Repeaters, Channel Banks, and S Alarms		
Elgin	RTU with Interfaces to Repeaters, Channel Banks, and Site Alarms		
Creedmoor	RTU with Interfaces to Repeaters, Channel Banks, and Site Alarms		
Console Electronics Bank (CEB) Site	RTU with Interfaces to Console Central Electronics and UPS		

The MOSCAD alarm and control system will communicate over the microwave system or Customer provided RS-232 links for alarm status points. For MOSCAD alarm and control terminals, site connectivity is accomplished via10baseT Ethernet LAN.

### SUMMARY OF DEVICE INTERFACES

Table 8: Summary of Device Interfaces

Equipment being interfaced.	Specific Model	Interface:		
Basestation/Repeater.	QUANTAR/QUANTRO	Serial interface to RSS port using "C compiled" Flash file in MOSCAD CPU providing limited RSS.  Serial interface via its RS232 printer port.		
Console Electronics	Gold Series Central Electronics Bank			
Microwave Equipment.	Harris M/W Radios: DVM-45, DVM-8T, MegaStar	Serial interface to the radio diagnostic port using "C compiler" of MOSCAD CPU.  Serial interface to the radio service channe to send & receive MDLC data.		
	& Quadralink.			
Premisys Channel Bank Equipment	Premisys TeNSr C.B.	Serial Alarm Diagnostic interface.		
Premisys Channel Bank Equipment	Premisys TeNSr C.B.	Remote Configuration via VT-100 RS-232 interface.		
Efratom GPS Receiver	Efratom GPS Receiver	Serial Alarm Diagnostic interface.		
Comparators	ASTRO-TAC/ ASTRO-TAC 3000	Serial Interface		
Digital Interface Unit	ASTRO DIU	Serial Interface		
Trunking Controller	Controller	Dry-Contacts.		

## SUMMARY OF SITE ALARMS

The following are the various site equipment alarm status points required by the Customer. Motorola is providing an I/O for each required alarm. The

environmental/site alarms are collected via the MOSCAD Remote Terminal Units (RTU) I/O modules. Motorola is providing the alarm monitoring points listed, however the alarm inputs and/or sensors are contingent upon purchased equipment at a specific location (e.g. generators, shelters, towers, etc.)

Table 9: Environmental and Site Alarm Monitoring Points Per Site

	CONTRACTOR
Note: The CECC environmental/site, generate provided by the Customer. Motorola is not pro-	
Smoke Detector	Generator Fuel Level
Door 1 Alarm	UPS Alarm
Door 2 Alarm	UPS Operation - On
High Temperature	AC Surge Supresser Alarm
Low Temperature	LPG Fuel Leak Detector * only if Propane GenSet used
AC Power Fail	Microwave Battery Voltage
Generator Run	Dehydrator Alarm
Generator Transferred	Battery Charger Alarm
Generator Fail	System 2 Prime Controller A – Major Alarm
Generator Over Speed	System 2 Prime Controller B – Major Alarm
Generator Low Oil Pressure	System 2 Site Trunking
Generator High Temperature	Generator Low Coolant
Generator Low Oil	10 Spare Digital Inputs
Smoke Detector	Repeater Battery Voltage
Smoke Detector	Repeater Battery Voltage
Door 1 Alarm	Dehydrator Alarm
Door 2 Alarm	Battery Charger 1 Alarm
High Temperature	System 1 Prime Controller A – Major Alarm
High Temperature Low Temperature	
Low Temperature	System 1 Prime Controller B - Major Alarm
Low Temperature AC Power Fail	System 1 Prime Controller B – Major Alarm System 1 Site Trunking
Low Temperature AC Power Fail Generator Run	System 1 Prime Controller B – Major Alarm System 1 Site Trunking Dehydrator Alarm (low pressure)
Low Temperature AC Power Fail Generator Run Generator Transferred	System 1 Prime Controller B – Major Alarm System 1 Site Trunking Dehydrator Alarm (low pressure) Battery Charger 2 Alarm
Low Temperature AC Power Fail Generator Run Generator Transferred Generator Fail	System 1 Prime Controller B – Major Alarm System 1 Site Trunking Dehydrator Alarm (low pressure) Battery Charger 2 Alarm System 1 Controller Major Alarm
Low Temperature  AC Power Fail  Generator Run  Generator Transferred  Generator Fail  Generator Over Speed  Generator Low Oil Pressure	System 1 Prime Controller B – Major Alarm System 1 Site Trunking Dehydrator Alarm (low pressure) Battery Charger 2 Alarm System 1 Controller Major Alarm System 2 Controller Major Alarm
Low Temperature  AC Power Fail  Generator Run  Generator Transferred  Generator Fail  Generator Over Speed  Generator Low Oil Pressure  Generator High Temperature	System 1 Prime Controller B – Major Alarm System 1 Site Trunking Dehydrator Alarm (low pressure) Battery Charger 2 Alarm System 1 Controller Major Alarm System 2 Controller Major Alarm Tower Top Amp 1 Alarm
Low Temperature  AC Power Fail  Generator Run  Generator Transferred  Generator Fail  Generator Over Speed  Generator Low Oil Pressure  Generator High Temperature  Generator Low Oil	System 1 Prime Controller B – Major Alarm System 1 Site Trunking Dehydrator Alarm (low pressure) Battery Charger 2 Alarm System 1 Controller Major Alarm System 2 Controller Major Alarm Tower Top Amp 1 Alarm Tower Top Amp 2 Alarm
Low Temperature  AC Power Fail  Generator Run  Generator Transferred  Generator Fail  Generator Over Speed  Generator Low Oil Pressure  Generator High Temperature  Generator Low Oil	System 1 Prime Controller B – Major Alarm System 1 Site Trunking Dehydrator Alarm (low pressure) Battery Charger 2 Alarm System 1 Controller Major Alarm System 2 Controller Major Alarm Tower Top Amp 1 Alarm Tower Top Amp 2 Alarm Transmit Antenna 1 VSWR
Low Temperature  AC Power Fail  Generator Run  Generator Transferred  Generator Fail  Generator Over Speed  Generator Low Oil Pressure  Generator High Temperature  Generator Low Oil  Generator Low Coolant	System 1 Prime Controller B – Major Alarm System 1 Site Trunking Dehydrator Alarm (low pressure) Battery Charger 2 Alarm System 1 Controller Major Alarm System 2 Controller Major Alarm Tower Top Amp 1 Alarm Tower Top Amp 2 Alarm Transmit Antenna 1 VSWR Transmit Antenna 2 VSWR
Low Temperature  AC Power Fail  Generator Run  Generator Transferred  Generator Fail  Generator Over Speed  Generator Low Oil Pressure  Generator High Temperature  Generator Low Oil  Generator Low Coolant  Generator Fuel Level	System 1 Prime Controller B – Major Alarm System 1 Site Trunking Dehydrator Alarm (low pressure) Battery Charger 2 Alarm System 1 Controller Major Alarm System 2 Controller Major Alarm Tower Top Amp 1 Alarm Tower Top Amp 2 Alarm Transmit Antenna 1 VSWR Transmit Antenna 2 VSWR Transmit Antenna 3 VSWR

Smoke Detector  Door 1 Alarm	Perimeter Alarm – Fence Gate  Tower Light Failure				
Door 1 Alarm Door 2 Alarm	Tower Light Failure  Tower Top Amp 1 Alarm				
120 (1 10 10 10 10 10 10 10 10 10 10 10 10 10					
High Temperature	Tower Top Amp 2 Alarm Transmit Antenna 1 VSWR				
Low Temperature	Transmit Antenna 1 VSVVR  Transmit Antenna 2 VSWR				
AC Power Fail					
Generator Run	Transmit Antenna 3 VSWR				
Generator Transferred	Transmit Antenna 4 VSWR				
Generator Fail	Transmit Antenna 5 VSWR				
Generator Over Speed	Site Controller 1 Major Alarm				
Generator Low Oil Pressure	Site Controller 2 Major Alarm				
Generator High Temperature	Repeater Battery Voltage				
Generator Low Oil	Battery Charger 1 Alarm				
Generator Low Coolant	Battery Charger 2 Alarm				
Generator Fuel Level	Dehydrator Alarm (low pressure)				
AC Surge Supresser Alarm	Microwave Battery Voltage				
LPG Fuel Leak Detector * only if Propane GenSet used	10 Spare Digital Inputs				
Simulcast Remote Site - 1 System					
Smoke Detector	Perimeter Alarm – Fence Gate				
Door 1 Alarm	Tower Light Failure				
Door 2 Alarm	Tower Top Amp 1 Alarm				
High Temperature	Transmit Antenna 1 VSWR				
Low Temperature	Transmit Antenna 2 VSWR				
AC Power Fail	Transmit Antenna 3 VSWR				
Generator Run	Site Controller 1 Major Alarm				
Generator Transferred	Repeater Battery Voltage				
Generator Fail	Battery Charger 1 Alarm				
Generator Over Speed	Battery Charger 2 Alarm				
Generator Low Oil Pressure	Dehydrator Alarm (low pressure)				
Generator High Temperature	AC Surge Supresser Alarm				
Generator Low Oil	LPG Fuel Leak Detector * only if Propans GenSet used				
Generator Low Coolant	Microwave Battery Voltage				
Generator Fuel Level	10 Spare Digital Inputs				
IntelliRepeater Site					
Smoke Detector	Perimeter Alarm – Fence Gate				
Door 1 Alarm	Tower Light Failure				
Door 2 Alarm	Tower Top Amp 1 Alarm				
High Temperature	Transmit Antenna 1 VSWR				
Low Temperature	Repeater Battery Voltage				
AC Power Fail	Battery Charger 1 Alarm				
Generator Run	Battery Charger 2 Alarm				
Generator Transferred	Dehydrator Alarm (low pressure)				
Generator Fail	AC Surge Supresser Alarm				

Generator Over Speed	LPG Fuel Leak Detector * only if Propane GenSet used
Generator Low Oil Pressure	Microwave Battery Voltage
Generator High Temperature	Generator Fuel Level
Generator Low Oil	10 Spare Digital Inputs
Generator Low Coolant	

## Dispatch Console Subsystem OVERVIEW

Motorola's proposal includes an Embassy Series Console Network to support dispatching requirements for the Customer's ASTRO Digital Trunked Simulcast System. The Embassy Network consists of three (3) major components.

- CENTRACOM Elite Dispatcher Console Operator Position
- Gold Series Central Electronics Bank (CEB)
- Gold Series Ambassador Electronics Bank (AEB)

The Gold Elite dispatch operator Graphical User Interface (GUI) application runs on a Windows NT computer. The Gold Elite console network utilizes a Windows NT server for Console and Alias Database Management (ADM/CDM). The Console Electronics Bank (CEB) and Ambassador Electronics Bank (AEB) utilize firmware for real time audio processing.

## CENTRACOM Elite Dispatcher Console Operator Position

Each CRT based CENTRACOM Elite dispatcher console includes the following hardware:

- Windows NT workstation including CPU, keyboard, mouse and 21" touch screen color monitor.
- Console Interface Enclosure (CIE)
- Two headset jacks
- Dual PTT Footswitch
- · Gooseneck microphone

## CENTRACOM Elite Console Interface Enclosure (CIE)

On the desktop console, all electronics are contained in the Console Interface Enclosure (CIE). All electronic boards are easily accessible by removing the top cover of the CIE.

A large transmit button is provided on the front panel of the CIE. This button is large and red in color to allow easy allocation and access for the operator. This button will allow the operator to transmit on the currently selected resource(s).

Two speaker/amplifiers are provided. Both speakers face forward, toward the operator. The left-most speaker will reproduce the audio from the resource(s) that have been selected for operation. The right-most speaker will reproduce the audio from all the other active resources in the console (Unselected).

## Gold Series Central Electronics Bank (CEB)

The Gold Series Central Electronics Bank (CEB) is composed of a series of interface modules linked by digital audio buses. These interfaces use a time division data transfer scheme to route audio and signaling between the AEB and the dispatcher consoles. The CEB offers a high level of redundancy and internal diagnostic capabilities that serve to maximize the availability of the CENTRACOM console system.

The various interface modules supported by the CEB reside in a series of cabinets, or equipment rack mounted card cages, each of which can accommodate up to ten (10) modules. The size, and number, of CEBs are determined by the number of modules required to interface to all dispatcher consoles, conventional channels, telephone lines, and any other items requiring a direct interface to the radio dispatching system (such as logging recorders or control stations). CEB modules to be provided for the Customer's console system at the various dispatch sites are as follows:

- Ambassador Interface Mux Interface (AIMI):
- · Console Operator Interface Module (COIM):
- Base Interface Modules (BIMs):
- Also included in the CEBs are BIMs for the NPSPAC system,BIMs for Williamson County for console interoperability,and a Time Sync channel (NetClock/GPS) (only one required for the entire console system)
- Logging Recorder Interface (LORI): The logging recorder interface allows a talkgroup to be recorded on a single logging recorder track.
- Following is a list of locations with LORIs and the number of talkgroups available for recording:

## Gold Series Ambassador Electronics Bank (AEB)

As the "heart" of the dispatch network, the AEB is a large capacity Time Division Multiplexing (TDM) audio processing switch that is used in SmartZone systems to route the repeater and dispatch audio throughout the system. All the audio processing in a SmartZone system occurs in cards inside the AEB called Ambassador Boards (AMBs).

The AEB routes audio between remote SmartZone sites via T1s and channel banks, console operator positions via CEBs, and conventional base stations via CEBs and BIMs. All audio interfacing to the AEB is via T1s, created by channel banks, or CEBs. The AEB for the Customer will have three (3) card cages, equipped with enough AMBs to support the SmartZone system. The AEB has room for at least 2 AMB cards for new consoles or sites.

### Control Stations

Motorola's system includes three (3) types of control stations: the Motorola ASTRO Digital Remote Control Consolette (local control available as an option), the local control ASTRO Spectra W7, and the local control MCS 2000 Model III analog Control Station.

#### ASTRO DIGITAL CONSOLETTE

The primary control station offered by Motorola is the ASTRO Digital Consolette. The ASTRO Digital Consolette is packaged in a single housing and specifically designed to be used on a desk or counter top. The ASTRO Digital Consolette utilizes an ASTRO Spectra mobile radio capable of ASTRO Conventional, SMARTNET, and SmartZone trunking with basic transmit and receive operation in the ASTRO and Analog modes.

The ASTRO Digital Consolette is available in two (2) different models: Local Control and Digital Remote Control. The Local Control version differentiates itself by utilizing the ASTRO Spectra radio control head within the plastic housing. The front panel display assembly consists of the W7 control head (1 line/8 character display and 3x4 keypad for direct dialing), internal 5 watt speaker, Power-On LED, optional VU meter/clock, and optional encryption key variable loader connector. Transmit audio is provided with a standard desk microphone. All Consolette features are accessible from the control panel with operations being the same as the W7 ASTRO Spectra mobile radio.

The ASTRO Consolette with the Digital Remote Control option allows full feature remote control operation from a RCH 3000 digital control deskset communicating with the Consolette via a rear panel connector. Up to six RCH 3000 digital control desksets may be connected to an ASTRO Digital Consolette.

The RCH 3000 Digital Desktop Controller is available in both Local and Remote configurations and can control all standard radio functions (trunking and conventional) of Motorola's ASTRO Digital Consolette.

## **ASTRO SPECTRA "W7" CONTROL STATION**

The ASTRO Spectra W7 Control Station model is a mobile radio mounted in a special tray for desktop applications. It has some of the same capabilities as the ASTRO Digital Consolette local control model.

## MCS 2000 "MODEL III" ANALOG CONTROL STATION

The MCS 2000 Model III Control Station model is a mobile radio mounted in a special tray for desktop applications. It is an analog companion to the ASTRO Spectra W7.

**Table 4: Equipment Shelters** 

Site	Equipment Shelter Size	Generator Shelter Size	Shelter Space for Equipment Racks	Minimum Racks for Radio Equipment	Rack Space for Expansion
Master Site					
CECC	Customer Provided	Customer Provided	N/A	60	N/A
Main Repeater Sites					
Martin Hill	15' W x 33' L x 9' H	11' W x 17' L x 9' H	30	20	10
Four Points	15' W x 33' L x 9' H	11' W x 17' L x 9' H	30	20	10
Davis Lane	15' W x 33' L x 9' H	11' W x 17' L x 9' H	30	20	10
Johnny Morris	15' W x 33' L x 9' H	11' W x 17' L x 9' H	30	20	10
Mount Larson	Customer Provided	Customer Provided	N/A	36	N/A
UT RLM	Customer Provided	Customer Provided	N/A	20	N/A
UT Bergstrom	15' W x 33' L x 9' H	11' W x 17' L x 9' H	30	20	10
UT Pickle	15' W x 33' L x 9' H	11' W x 17' L x 9' H	30	20	10
County Satellite Three	15' W x 33' L x 9" H	11' W x 17' L x 9' H	30	12	18
Lime Creek	15' W x 33' L x 9' H	11' W x 17' L x 9' H	30	12	18
Intellirepeater Sites					
Cow Creek	12' W x 34□ L x 9' H	generator in equipment shelter	12	4	8
Hamilton Pool	12' W x 34□ L x 9' H	generator in equipment shelter	12	4	8
Round Mountain	12' W x 34□ L x 9' H	generator in equipment shelter	12	4	8
Barton Creek	12' W x 34  L x 9' H	generator in equipment shelter	12	4	8
Austrop	12' W x 34□ L x 9' H	generator in equipment shelter	12	4	8
Creedmoor	12' W x 34() L x 9' H	generator in equipment shelter	12	4	8
Elgin	12' W x 34.) L x 9' H	generator in equipment shelter	12	4	8

Motorola's proposal includes quotes for six (6) new communications towers. The towers are sized to support fourteen (14) Celwave BMR 12-O antennas and four (4) 6 ft. microwave dishes. The following sites will have new towers constructed:

Table 5: New Towers

Site	Height		
U T Bergstrom	200' Guyed		
Round Mountain	250' Guyed		
Hamilton Pool	300' Guyed		
Johnny Morris	390' Guyed		
Cow Creek	400' Guyed		
County Satellite Three	450' Guyed		

### Inter-Site Communications

The site connectivity is currently under review by the Customer. Once a final determination is made, the inter-site communications can be finalized. The Harris solution is Motorola's primary offering, and the Nortel solution is Motorola's secondary and conditional offering. Motorola's Proposal regarding the microwave radio system is premised solely upon the primary offering and the use of Harris as the microwave subcontractor. Motorola's responses and indications of compliance, clarifications, and or exceptions are valid only concerning the primary offering.

Section 8 of the Request for Proposal detailed the Customer's site connectivity needs. Below is a summary of site connectivity.

- Motorola Provided SONET Loop Microwave for Simulcast Sites
- Motorola Provided Spur Hops to Western and Eastern IntelliRepeaters Filler Sites
- Six (6) Customer Provided T1s or Ethernet links from CECC Temporary
  Facility to Three (3) System Management Locations (Potentially none
  required due to co-location of System Management at the CECC, two T1s per
  location)
- Customer Provided Circuits for Console Locations (note: not required for operator positions located at CECC)

## SITE CONNECTIVITY PLAN

Below is the PRELIMINARY site connectivity plan. The plan contains the provider, type of circuit, and end points for each location.

Table 6: Site Connectivity Plan

No.	Loop Spur	DS 3	T-1	Link Type	Site From	Site To	Usage	Provider
SITE	INKS TO	MASTER						
1	L	1	1	T1	CECC	Mount Larson	System 1 to Master	Motorola uW
2	L	1	2	T1	CECC	Mount Larson	System 1 to Master	Motorola uW
3	L&S	1	3	Ti	CECC	Cow Creek	IR Site to Master	Motorola uW
4	L&S	1	4	T1	CECC	Cow Creek	IR Site to Master (reserved for future)	Motorola uW
5	L&S	1	5	T1	CECC	Hamilton Pool	IR Site to Master	Motorola uW
6	L&S	1	6	T1	CECC	Hamilton Pool	IR Site to Master (reserved for future)	Motorola uW
7	L&S	1	7	T1	CECC	Barton Creek	IR Site to Master	Motorola uW
8	L&S	1	8	J1	CECC	Barton Creek	IR Site to Master (reserved for future)	Motorola uW
9	L&S	1	9	T1	CECC	Round Mountain	IR Site to Master	Motorola uW
10	L&S	1	10	T1	CECC	Round Mountain	IR Site to Master (reserved for future)	Motorola uW
55	L&S	3	TBD	T1	CECC	Elgin	IR Site to Master	Motorola uW
56	L&S	3	TBD	T1	CECC	Elgin	IR Site to Master (reserved for future)	Motorola uW
57	L&S	3	TBD	T1	CECC	Creedmoor	IR Site to Master	Motorola uW
58	L&S	3	TBD	T1	CECC	Creedmoor	IR Site to Master (reserved for future)	Motorola uW
59	L&S	3	TBD	TI	CECC	Austrop	IR Site to Master	Motorola uW
60	L&S	3	TBD	T1	CECC	Austrop	IR Site to Master (reserved for future)	Motorola uW
SIMU	LCAST T-1		<u></u>					1
11	Ļ	1	11	T1	Mount Larson	Johnny Morris	System 1 Odd Channels	Motorola uW
12	L	1	12	T1	Mount Larson	Johnny Morris	System 1 Even Channels	Motorola uW
13	L	1	13	T1	Mount Larson	UT RLM	System 1 Odd Channels	Motorola uW
14	L	1	14	T1	Mount Larson	UT RLM	System 1 Even Channels	Motorola uW
15	L	11	15	T1	Mount Larson	UT Pickle	System 1 Odd Channels	Motorola uW
16	L	1	16	T1	Mount	UT Pickle	System 1 Even	Motorola uW

# PRELIMINARY SYSTEM DESCRIPTION CITY OF AUSTIN TRUNKED RADIO PROJECT

No.	Loop	DS 3	T-1	Link Type	Site From	Site To	Usage	Provider
				10.0	Larson		Channels	
17	L	1	17	T1	Mount Larson	Martin Hill	System 1 Odd Channels	Motorola uW
18	L	1	18	T1	Mount Larson	Martin Hill	System 1 Even Channels	Motorola uW
19	L	1	19	T1	Mount Larson	Four Points	System 1 Odd Channels	Motorola uW
20	L	1	20	T1	Mount Larson	Four Points	System 1 Even Channels	Motorola uW
21	L	1	21	T1	Mount Larson	Lime Creek	System 1 Odd Channels	Motorola uW
22	L	1	22	T1.	Mount Larson	Lime Creek	System 1 Even Channels	Motorola uW
23	L	1	23	Ţ1	Mount Larson	County Satellite Three	System 1 Odd Channels	Motorola uW
24	L.	1	24	T1	Mount Larson	County Satellite Three	System 1 Even Channels	Motorola uW
25	L	1	25	T1	Mount Larson	Davis Lane	System 1 Odd Channels	Motorola uW
26	L	1	26	T1	Mount Larson	Davis Lane	System 1 Even Channels	Motorola uW
27	L	1	27	T1	Mount Larson	UT Bergstrom	System 1 Odd Channels	Motorola uW
28	L	1	28	T1	Mount Larson	UT Bergstrom	System 1 Even Channels	Motorola uW
29	Ľ-	2	1	TI	CECC	Johnny Morris	System 2 Odd Channels	Motorola uW
30	L	2	2	T1	CECC	Johnny Morris	System 2 Even Channels	Motorola uW
31	L	2	3	71	CECC	UT RLM	System 2 Odd Channels	Motorola uW
32	L	2	4	Ti	CECC	UT RLM	System 2 Even Channels	Motorola uW
33	L	2	5	T1	CECC	UT Pickle	System 2 Odd Channels	Motorola uW
34	L	2	6	T1/	CECC	UT Pickle	System 2 Even Channels	Motorola uW
35	L	2	7	T1	CECC	Martin Hill	System 2 Odd Channels	Motorola uW
36	L	2	8	T1	CECC	Martin Hill	System 2 Even Channels	Motorola uW
37	L,	2	9	T1	CECC	Four Points	System 2 Odd Channels	Motorola uW
38	L	2	10	T1	CECC	Four Points	System 2 Even Channels	Motorola uW
39	L	2	11	T1-	CECC	Mount Larson	System 2 Odd Channels	Motorola uW

No.	Loop Spur	DS 3	T-1	Link Type	Site From	Site To	Usage	Provider
40	L	2	12	T1	CECC	Mount Larson	System 2 Even Channels	Motorola uW
41	L	2	13	T1	CECC	Davis Lane	System 2 Odd Channels	Motorola uW
42	L	2	14	T1	CECC	Davis Lane	System 2 Even Channels	Motorola uW
43	L	2	15	Ĭ1	CECC	UT Bergstrom	System 2 Odd Channels	Motorola uW
44	L	2	16	T1	CECC	UT Bergstrom	System 2 Even Channels	Motorola uW
CON	/ENTIONA	L CHANN	NELS a	nd FUTURE	1			
45	L	2	17	T1	CECC	Johnny Morris	(Reserved for future)	Motorola uW
46	L	2	18	T1	CECC	UT RLM	(Reserved for future)	Motorola uW
47	L	2	19	T1	CECC	UT Pickle	(Reserved for future)	Motorola uW
48	L	2	20	T1	CECC	Martin Hill	(Reserved for future)	Motorola uW
49	L	2	21	T1	CECC	Four Points	(Reserved for future)	Motorola uW
50	L	2	22	T1	CECC	Lime Creek	(Reserved for future)	Motorola uW
51	L	2	23	11	CECC	County Satellite Three	(Reserved for future)	Motorola uW
52	L	2	24	T1	CECC	Mount Larson	Conventional Channels (NPSPAC)	Motorola uW
		2	25	Ťi	CECC	Davis Lane	(Reserved for future)	Motorola uW
53	L	-						

CECC = Combined Emergency Communications Center

System 1 = County Wide

System 2 = E620 (Austin City)

### RADIO INFRASTRUCTURE CONNECTIVITY

Radio infrastructure sites require T1 connectivity between Motorola provided Telecommunications Network Server (TeNSr) Channel banks. The detailed specifications for the T1 circuits are contained in an appendix to the Statement of Work. The details of the required T1s are contained in the site connectivity plan.

# System Management Subsystem USER EQUIPMENT

Motorola's SmartZone Manager and MOSCAD Alarm and Control provide user access points to control and manage the system. A total of 3 SmartZone Manager Terminals and 3 MOSCAD alarm and control terminals have been

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proposed. The SmartZone Manager application software utilizes Windows based clients. The MOSCAD alarm and control network utilizes In-Touch application software on a Windows NT computer.

## MOSCAD ALARM AND CONTROL SYSTEM

Motorola is proposing MOSCAD, a network fault management (alarm and control) system to monitor and display system operation. The following table lists the locations and alarm and control equipment located at each site.

Table 7: Locations and Quantities - Fault Management Equipment

Location	Network Fault Management Equipment				
CECC	Master Server, User Terminal				
CECC	RTU with Interfaces to DIU, Master Equipment, Comparators, Central Controller, GPS Receiver, Channel Banks, Site Alarms, and Microwave Alarm System				
UT RLM Building	RTU with Interfaces to DIU, Controller, GPS Receiver, Repeaters Channel Banks, Site Alarms, and Microwave Alarm System				
Johnny Morris	RTU with Interfaces to Remote Site Controller, GPS Receiver, Repeaters, Channel Banks, Site Alarms, and Microwave Alarm System				
UT Pickle	RTU with Interfaces to Remote Site Controller, GPS Receiver, Repeaters, Channel Banks, Site Alarms, and Microwave Alarm System				
Martin Hill	RTU with Interfaces to Remote Site Controller, GPS Receiver, Repeaters, Channel Banks, Site Alarms, and Microwave Alarm System				
Four Points	RTU with Interfaces to Remote Site Controller, GPS Receiver, Repeaters, Channel Banks, Site Alarms, and Microwave Alarm System				
Mount Larson	RTU with Interfaces to Remote Site Controller, GPS Receiver, Repeaters, Channel Banks, Site Alarms, and Microwave Alarm System				
County Satellite Three	RTU with Interfaces to Remote Site Controller, GPS Receiver, Repeaters, Channel Banks, Site Alarms, and Microwave Alarm System				
Davis Lane	RTU with Interfaces to Remote Site Controller, GPS Receiver, Repeaters, Channel Banks, Site Alarms, and Microwave Alarm System				
UT Bergstrom	RTU with Interfaces to Remote Site Controller, GPS Receiver, Repeaters, Channel Banks, Site Alarms, and Microwave Alarm System				
Lime Creek	RTU with Interfaces to Remote Site Controller, GPS Receiver, Repeaters, Channel Banks, Site Alarms, and Microwave Alarm System				
UT Barton Creek	RTU with Interfaces to Repeaters, Channel Banks, Site Alarms, and Microwave Alarm System				
Cow Creek	RTU with Interfaces to Repeaters, Channel Banks, Site Alarms, and Microwave Alarm System				
Round Mountain	RTU with Interfaces to Repeaters, Channel Banks, Site Alarms,				

Location	Network Fault Management Equipment		
	and Microwave Alarm System		
Hamilton Pool	RTU with Interfaces to Repeaters, Channel Banks, Site Alarms, and Microwave Alarm System		
Austrop	RTU with Interfaces to Repeaters, Channel Banks, and Site Alarms		
Elgin	RTU with Interfaces to Repeaters, Channel Banks, and Site Alarms		
Creedmoor	RTU with Interfaces to Repeaters, Channel Banks, and Site Alarms		
Console Electronics Bank (CEB) Site	RTU with Interfaces to Console Central Electronics and UPS		

The MOSCAD alarm and control system will communicate over the microwave system or Customer provided RS-232 links for alarm status points. For MOSCAD alarm and control terminals, site connectivity is accomplished via10baseT Ethernet LAN.

### SUMMARY OF DEVICE INTERFACES

Table 8: Summary of Device Interfaces

Equipment being interfaced.	Specific Model	Interface:
Basestation/Repeater	QUANTAR/QUANTRO	Serial interface to RSS port using "C compiled" Flash file in MOSCAD CPU providing limited RSS.
Console Electronics	Gold Series Central Electronics Bank	Serial interface via its RS232 printer port
Microwave Equipment.	Harris M/W Radios: DVM-45, DVM-8T, MegaStar & Quadralink.	Serial interface to the radio diagnostic port using "C compiler" of MOSCAD CPU.  Serial interface to the radio service channel to send & receive MDLC data.
Premisys Channel Bank Equipment	Premisys TeNSr C.B.	Serial Alarm Diagnostic interface.
Premisys Channel Bank Equipment	Premisys TeNSr C.B.	Remote Configuration via VT-100 RS-232 interface.
Efratom GPS Receiver	Efratom GPS Receiver	Serial Alarm Diagnostic interface.
Comparators	ASTRO-TAC/ ASTRO-TAC 3000	Serial Interface
Digital Interface Unit	ASTRO DIU	Serial Interface
Trunking Controller	Controller	Dry-Contacts

## SUMMARY OF SITE ALARMS

The following are the various site equipment alarm status points required by the Customer. Motorola is providing an I/O for each required alarm. The

environmental/site alarms are collected via the MOSCAD Remote Terminal Units (RTU) I/O modules. Motorola is providing the alarm monitoring points listed, however the alarm inputs and/or sensors are contingent upon purchased equipment at a specific location (e.g. generators, shelters, towers, etc.)

Table 9: Environmental and Site Alarm Monitoring Points Per Site

CECC Master Site and East 620 Prime  Note: The CECC environmental/site, genera provided by the Customer. Motorola is not pr	tor, and UPS alarm monitoring points must be		
Smoke Detector	Generator Fuel Level		
Door 1 Alarm	UPS Alarm		
Door 2 Alarm	UPS Operation - On		
High Temperature	AC Surge Supresser Alarm		
Low Temperature	LPG Fuel Leak Detector * only if Propane GenSet used		
AC Power Fail	Microwave Battery Voltage		
Generator Run	Dehydrator Alarm		
Generator Transferred	Battery Charger Alarm		
Generator Fail	System 2 Prime Controller A - Major Alarm		
Generator Over Speed	System 2 Prime Controller B - Major Alarm		
Generator Low Oil Pressure	System 2 Site Trunking		
Generator High Temperature	Generator Low Coolant		
Generator Low Oil	10 Spare Digital Inputs		
Smoke Detector	Repeater Battery Voltage		
Customer. Motorola is not proposing a shelte			
Door 1 Alarm	Dehydrator Alarm		
Door 2 Alarm	Battery Charger 1 Alarm		
High Temperature	System 1 Prime Controller A - Major Alarm		
Low Temperature	System 1 Prime Controller B - Major Alarm		
AC Power Fail	Continue & City Translation		
	System 1 Site Trunking		
Generator Run	Dehydrator Alarm (low pressure)		
Generator Run	Dehydrator Alarm (low pressure)		
Generator Run Generator Transferred	Dehydrator Alarm (low pressure) Battery Charger 2 Alarm		
Generator Run Generator Transferred Generator Fail	Dehydrator Alarm (low pressure)  Battery Charger 2 Alarm  System 1 Controller Major Alarm		
Generator Run Generator Transferred Generator Fail Generator Over Speed	Dehydrator Alarm (low pressure)  Battery Charger 2 Alarm  System 1 Controller Major Alarm  System 2 Controller Major Alarm		
Generator Run Generator Transferred Generator Fail Generator Over Speed Generator Low Oil Pressure	Dehydrator Alarm (low pressure)  Battery Charger 2 Alarm  System 1 Controller Major Alarm  System 2 Controller Major Alarm  Tower Top Amp 1 Alarm		
Generator Run Generator Transferred Generator Fail Generator Over Speed Generator Low Oil Pressure Generator High Temperature	Dehydrator Alarm (low pressure)  Battery Charger 2 Alarm  System 1 Controller Major Alarm  System 2 Controller Major Alarm  Tower Top Amp 1 Alarm  Tower Top Amp 2 Alarm		
Generator Run Generator Transferred Generator Fail Generator Over Speed Generator Low Oil Pressure Generator High Temperature Generator Low Oil	Dehydrator Alarm (low pressure)  Battery Charger 2 Alarm  System 1 Controller Major Alarm  System 2 Controller Major Alarm  Tower Top Amp 1 Alarm  Tower Top Amp 2 Alarm  Transmit Antenna 1 VSWR		
Generator Run Generator Transferred Generator Fail Generator Over Speed Generator Low Oil Pressure Generator High Temperature Generator Low Oil Generator Low Coolant	Dehydrator Alarm (low pressure)  Battery Charger 2 Alarm  System 1 Controller Major Alarm  System 2 Controller Major Alarm  Tower Top Amp 1 Alarm  Tower Top Amp 2 Alarm  Transmit Antenna 1 VSWR  Transmit Antenna 2 VSWR		
Generator Run Generator Transferred Generator Fail Generator Over Speed Generator Low Oil Pressure Generator High Temperature Generator Low Oil Generator Low Coolant Generator Fuel Level	Dehydrator Alarm (low pressure)  Battery Charger 2 Alarm  System 1 Controller Major Alarm  System 2 Controller Major Alarm  Tower Top Amp 1 Alarm  Tower Top Amp 2 Alarm  Transmit Antenna 1 VSWR  Transmit Antenna 2 VSWR  Transmit Antenna 3 VSWR		

Smoke Detector	Perimeter Alarm – Fence Gate		
Door 1 Alarm	Tower Light Failure		
Door 2 Alarm	Tower Top Amp 1 Alarm		
High Temperature	Tower Top Amp 2 Alarm		
Low Temperature	Transmit Antenna 1 VSWR		
AC Power Fail	Transmit Antenna 2 VSWR		
Generator Run	Transmit Antenna 3 VSWR		
Generator Transferred	Transmit Antenna 4 VSWR		
Generator Fail	Transmit Antenna 5 VSWR		
Generator Over Speed	Site Controller 1 Major Alarm		
Generator Low Oil Pressure	Site Controller 2 Major Alarm		
Generator High Temperature	Repeater Battery Voltage		
Generator Low Oil	Battery Charger 1 Alarm		
Generator Low Coolant	Battery Charger 2 Alarm		
Generator Fuel Level	Dehydrator Alarm (low pressure)		
AC Surge Supresser Alarm	Microwave Battery Voltage		
LPG Fuel Leak Detector * only if Propane GenSet used	10 Spare Digital Inputs		
Simulcast Remote Site - 1 System			
Smoke Detector	Perimeter Alarm – Fence Gate		
Door 1 Alarm	Tower Light Failure		
Door 2 Alarm	Tower Top Amp 1 Alarm		
High Temperature	Transmit Antenna 1 VSWR		
Low Temperature	Transmit Antenna 2 VSWR		
AC Power Fail	Transmit Antenna 3 VSWR		
Generator Run	Site Controller 1 Major Alarm		
Generator Transferred	Repeater Battery Voltage		
Generator Fail	Battery Charger 1 Alarm		
Generator Over Speed	Battery Charger 2 Alarm		
Generator Low Oil Pressure	Dehydrator Alarm (low pressure)		
Generator High Temperature	AC Surge Supresser Alarm		
Generator Low Oil	LPG Fuel Leak Detector * only if Propane GenSet used		
Generator Low Coolant	Microwave Battery Voltage		
Generator Fuel Level	10 Spare Digital Inputs		
IntelliRepeater Site			
Smoke Detector	Perimeter Alarm – Fence Gate		
Door 1 Alarm	Tower Light Failure		
Door 2 Alarm	Tower Top Amp 1 Alarm		
High Temperature	Transmit Antenna 1 VSWR		
Low Temperature	Repeater Battery Voltage		
AC Power Fail	Battery Charger 1 Alarm		
Generator Run	Battery Charger 2 Alarm		
Generator Transferred	Dehydrator Alarm (low pressure)		
Generator Fail	AC Surge Supresser Alarm		

Generator Over Speed	LPG Fuel Leak Detector * only if Propane GenSet used
Generator Low Oil Pressure	Microwave Battery Voltage
Generator High Temperature	Generator Fuel Level
Generator Low Oil	10 Spare Digital Inputs
Generator Low Coolant	

## Dispatch Console Subsystem OVERVIEW

Motorola's proposal includes an Embassy Series Console Network to support dispatching requirements for the Customer's ASTRO Digital Trunked Simulcast System. The Embassy Network consists of three (3) major components.

- CENTRACOM Elite Dispatcher Console Operator Position
- Gold Series Central Electronics Bank (CEB)
- Gold Series Ambassador Electronics Bank (AEB)

The Gold Elite dispatch operator Graphical User Interface (GUI) application runs on a Windows NT computer. The Gold Elite console network utilizes a Windows NT server for Console and Alias Database Management (ADM/CDM). The Console Electronics Bank (CEB) and Ambassador Electronics Bank (AEB) utilize firmware for real time audio processing.

## CENTRACOM Elite Dispatcher Console Operator Position

Each CRT based CENTRACOM Elite dispatcher console includes the following hardware:

- Windows NT workstation including CPU, keyboard, mouse and 21" touch screen color monitor.
- Console Interface Enclosure (CIE)
- Two headset jacks
- Dual PTT Footswitch
- Gooseneck microphone

## CENTRACOM Elite Console Interface Enclosure (CIE)

On the desktop console, all electronics are contained in the Console Interface Enclosure (CIE). All electronic boards are easily accessible by removing the top cover of the CIE.

A large transmit button is provided on the front panel of the CIE. This button is large and red in color to allow easy allocation and access for the operator. This button will allow the operator to transmit on the currently selected resource(s).

Two speaker/amplifiers are provided. Both speakers face forward, toward the operator. The left-most speaker will reproduce the audio from the resource(s) that have been selected for operation. The right-most speaker will reproduce the audio from all the other active resources in the console (Unselected).

## Gold Series Central Electronics Bank (CEB)

The Gold Series Central Electronics Bank (CEB) is composed of a series of interface modules linked by digital audio buses. These interfaces use a time division data transfer scheme to route audio and signaling between the AEB and the dispatcher consoles. The CEB offers a high level of redundancy and internal diagnostic capabilities that serve to maximize the availability of the CENTRACOM console system.

The various interface modules supported by the CEB reside in a series of cabinets, or equipment rack mounted card cages, each of which can accommodate up to ten (10) modules. The size, and number, of CEBs are determined by the number of modules required to interface to all dispatcher consoles, conventional channels, telephone lines, and any other items requiring a direct interface to the radio dispatching system (such as logging recorders or control stations). CEB modules to be provided for the Customer's console system at the various dispatch sites are as follows:

- Ambassador Interface Mux Interface (AIMI):
- Console Operator Interface Module (COIM):
- Base Interface Modules (BIMs):
- Also included in the CEBs are BIMs for the NPSPAC system, BIMs for Williamson County for console interoperability, and a Time Sync channel (NetClock/GPS) (only one required for the entire console system)
- Logging Recorder Interface (LORI): The logging recorder interface allows a talkgroup to be recorded on a single logging recorder track.
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### **ASTRO DIGITAL CONSOLETTE**

The primary control station offered by Motorola is the ASTRO Digital Consolette. The ASTRO Digital Consolette is packaged in a single housing and specifically designed to be used on a desk or counter top. The ASTRO Digital Consolette utilizes an ASTRO Spectra mobile radio capable of ASTRO Conventional, SMARTNET, and SmartZone trunking with basic transmit and receive operation in the ASTRO and Analog modes.

The ASTRO Digital Consolette is available in two (2) different models: Local Control and Digital Remote Control. The Local Control version differentiates itself by utilizing the ASTRO Spectra radio control head within the plastic housing. The front panel display assembly consists of the W7 control head (1 line/8 character display and 3x4 keypad for direct dialing), internal 5 watt speaker, Power-On LED, optional VU meter/clock, and optional encryption key variable loader connector. Transmit audio is provided with a standard desk microphone. All Consolette features are accessible from the control panel with operations being the same as the W7 ASTRO Spectra mobile radio.

The ASTRO Consolette with the Digital Remote Control option allows full feature remote control operation from a RCH 3000 digital control deskset communicating with the Consolette via a rear panel connector. Up to six RCH 3000 digital control desksets may be connected to an ASTRO Digital Consolette.

The RCH 3000 Digital Desktop Controller is available in both Local and Remote configurations and can control all standard radio functions (trunking and conventional) of Motorola's ASTRO Digital Consolette.

## **ASTRO SPECTRA "W7" CONTROL STATION**

The ASTRO Spectra W7 Control Station model is a mobile radio mounted in a special tray for desktop applications. It has some of the same capabilities as the ASTRO Digital Consolette local control model.

## MCS 2000 "MODEL III" ANALOG CONTROL STATION

The MCS 2000 Model III Control Station model is a mobile radio mounted in a special tray for desktop applications. It is an analog companion to the ASTRO Spectra W7.

## Exhibit B-4

Equipment List 911 RDMT Radio Project

## **Exhibit C**

Enhanced System Support
Statement of Work
RDMT Radio Project

#### EXHIBIT C

#### ENHANCED SYSTEM SUPPORT

#### Statement of Work

#### Definitions

#### 1.0 Definitions

Capitalized terms used in this Statement of Work and not otherwise defined within the Statement of Work or Communications System Agreement have the following meanings:

- .1 Case Number: Electronic tracking document for requests for service on Customer's System through the System Support Center.
- .2 Core Release: A new version of Software that adds Standard Features and major enhancements. These new versions are signified by changes to the first digit of the version identifier number (e.g. SmartZone 3.0.3 to SmartZone 4.0).
- .3 Customer: The end-user Customer as identified in the Communications System Agreement.
- .4 Customer Support Plan: A document mutually developed by Motorola and the Customer that provides information about the Customer and the System and describes the specific processes by which Motorola will deliver and the Customer will receive the services promised under this ESS Statement of Work.
- .5 Continuously: Seven (7) days per week, twenty four (24) hours per day, three hundred sixty five (365) days per year including holidays.
- .6 Enhancement Release: A superseding issue of Software, which adds to, improves, or enhances the performance of Standard Features contained in the then currently shipping Software version. These releases are signified by changes to the second digit of the version identifier number (e.g. SmartZone 3.1 to SmartZone 3.2).
- .7 Equipment: The equipment specified in the Equipment List as set forth in the Communications System Agreement, including any mutually agreed additions to the Equipment List during the Warranty Period.
- .8 ESS Period: The 12 month period commencing at the start of the Warranty Period for Equipment, Services, and Software as defined by the Communications System Agreement.
- .9 Event: An alarm or informational notification received by Motorola through the Network Management tools or notification by Customer that a problem exists.
- .10 Firmware: Software in object code form that is implanted or embedded in hardware.
- .11 Infrastructure: The fixed Equipment excluding mobiles, portables, and accessories.
- .12 Maintenance: The process for determining the cause of Equipment failure, removing, repairing, or replacing parts or elements necessary in order to conform the Equipment with the manufacturer's specifications along with system specific specifications, delivering and reinstalling the parts, and placing the Equipment back into operation.
- .13 Motorola Software: Software whose copyright is owned by Motorola.
- .14 Non-Motorola Software: is third party software whose copyright is owned by a party other than Motorola, including both software licensed directly by a third party vendor to the Customer or sub-licensed by Motorola to the Customer.

- .15 Response: Response times are defined as when a technician, a remote systems technologist or a remote network specialist is actively working the technical issue, remotely or on-site.
- .16 Restore/Restoration: The effort required to bring Equipment to the level for which it was designed, engineered and adjusted for performance in accordance with the manufacturer's published specifications, although such Equipment may not necessarily be malfunctioning.
- .17 Servicer: a Motorola Authorized Service Station or Motorola Field Service personnel.
- .18 Software: Includes Motorola and any non-Motorola Software that may be furnished with the Communications System.
- .19 Standard Business Day: Monday through Friday, 8:00 a.m. to 4:30 p.m., local time, excluding Motorola and Customer observed holidays.
- .20 Standard Feature: A software functionality for components of Customer's System that is available to Customer in the standard software release.
- .21 System: System is the communications system as defined in the Communications System Agreement.
- .22 System Acceptance: Unless otherwise defined in the Communications System Agreement, the date upon which Motorola has successfully completed all of the System tests as described in the Acceptance Test Plan.
- .23 System Support Center: A Motorola facility located in Schaumburg, Illinois, the purpose of which is to serve as Motorola's centralized system support facility to compliment the field support resources. The System Support Center is referred to as the "SSC."

## Description of Services

Enhanced System Support (ESS) is a bundled service and support package designed to support both the software and hardware components of new Systems during the ESS Period. By combining these services into a comprehensive and cohesive offering, Motorola is able to most effectively deliver technical support, diagnostic assistance, and restoration services in a thorough and timely manner.

During the ESS Period, ESS services supplement and compliment the Warranty as described in the Communications System Agreement. The full offering of ESS services is included in the System price. After the ESS Period expires, these services are available for purchase either in "System Support Services" packages or as individual service products. ESS services will be provided in accordance with the terms and conditions set forth at the end of this ESS Statement of Work and the Software Subscription Agreement which is attached as an exhibit to the Communications System Agreement. If any conflict exists between the ESS Statement of Work provisions and the ESS Terms and Conditions, the ESS Terms and Conditions shall prevail.

Motorola Enhanced System Support is comprised of the following service products that will be described in greater detail later in this ESS Statement Of Work:

- Dispatch Service
- Technical Support
- Network Management Service
- OnSite Infrastructure Response
- System Survey and Analysis
- Software Subscription Agreement
- Infrastructure Software Installation
- Software Upgrade Design

## 1.0 Motorola has the following responsibilities:

- All services described in the ESS Statement of Work and all services provided by Motorola will be provided in accordance with the terms of the Communications System Agreement and will cover only the Equipment and related Software.
- .2 Prepare a Customer Support Plan in conjunction with the Customer. The preferred time to prepare the Customer Support Plan is before System Acceptance.

## 2.0 Customer has the following responsibilities:

- Prepare a Customer Support Plan in conjunction with Motorola. The preferred time to prepare the Customer Support Plan is before System Acceptance. The Customer must provide all information necessary to complete the Customer Support Plan.
- .2 Cooperate with Motorola so that Motorola can provide all the ESS services described below to Customer.

### Dispatch Service

#### 3.0 Description of Service

The Call Center Operation at Motorola's SSC Continuously provides a central point of contact for technical customer service requests. The Call Center Operation is staffed with Customer Support Representatives who coordinates the appropriate service response and resources. Service requests are tracked and monitored from creation to close through an electronic Case Number process.

- 4.0 Motorola has the following responsibilities:
  - 1 Continuously receive technical service requests from Customer via telephone.
  - .2 Prompt Customer for information necessary to open a Case Number to characterize the issue, determine a plan of action, assign the case to the proper SSC resource, and track the issue to resolution.
  - .3 Dispatch a Servicer as required by standard procedures as agreed to in the Customer Support Plan.
  - .4 Notify Customer of the expected arrival of the Servicer at the designated location.

- .5 Confirm with Customer that Restoration is complete or System is functional. If confirmation with Customer cannot be completed within 30 minutes of Restoration, the Servicer will be released, unless Customer requests Servicer remain for further verification. The Case Number will not be closed until Customer verifies Restoration.
- .6 Ensure the required personnel have access to Motorola's Customer information as needed.
- .7 Have access to Motorola's Customer System records, including incident history and site access requirements
- .8 Escalate the Case Number to the appropriate party upon expiration of a Response time.
- .9 Provide monthly activity reports to Customer via the Customer Support Manager.
- 5.0 Customer has the following responsibilities:
  - .1 Call the SSC Call Center Operation when needed and provide the assigned System ID number, problem description, and other pertinent information for Motorola to open a Case Number.
  - .2 Complete and submit all required database and escalation procedure forms to be entered and stored at the System Support Center prior to System Acceptance.
  - .3 Submit changes in any information supplied in the Customer Support Plan to the Customer Support Manager.

### Remote Technical Support

#### 6.0 Description of Service

The Technical Support Operation at Motorola's SSC provides to Customer's technical staff centralized remote support for technical issues that require a high level of communications systems expertise or troubleshooting on the Equipment, Services, and Software. The Technical Support Operation is staffed with technical consultants who specialize in the diagnosis and resolution of system performance issues. Technical Support is only available on installed systems currently supported by the System Support Center.

- 7.0 Motorola has the following responsibilities:
  - Provide Technical Support Operation availability for all Severity 1 issues Continuously.
  - 2.2 Respond to requests for Technical Support in accordance with the Response times and Severity Levels listed in Table B at the back of this Statement of Work.
  - 2.3 Advise caller with procedure for System Restoration or issue resolution.
  - 2.4 As needed, coordinate with the Servicer in the field until close of the Case.

- 2.5 Coordinate technical resolutions with agreed upon third party vendor(s), as needed.
- 2.6 Escalate support issues to Motorola engineering and product groups, if necessary.
- 2.7 Provide a focal point for any systemic issue and manage the systemic issue to resolution.
- 2.8 Escalate the Case Number to the appropriate party upon expiration of a Response time.
- 2.9 Provide remote assistance to customers with the installation of Motorola Enhancement Releases if needed, if the Enhancement Release(s) is provided pursuant to a Motorola Software Subscription Agreement.

## 8.0 Customer has the following responsibilities:

- 3.1 Complete and submit all required database and escalation procedure forms to be entered and stored at the System Support Center prior to System Acceptance.
- 3.2 Submit changes in any information supplied in the above documents to the Customer Support Manager prior to the change taking effect.
- 3.3 Contact the System Support Center in order to access the Technical Support Operation, provide name of caller, name of Customer, System ID number, Service Agreement number, site(s) in questions, and brief nature of problem.
- 3.4 Supply on-site presence when requested by System Support Center.
- 3.5 Validate issue resolution prior to close of the Case.
- 3.6 Allow Motorola remote access to the System.

#### Network Management Service

## 9.0 Description of Service

Network Management Service electronically monitors specific elements of the System for Events and when detected are forwarded to the Motorola System Support Center using system specific monitoring tools. The System Support Center is staffed with trained technologists, who acknowledge the Event, run available diagnostic routines, and initiate an appropriate response.

### 10.0 Motorola has the following responsibilities:

- .1 Install monitoring hardware prior to System Acceptance.
- .2 Verify connections and Event monitoring prior to System Acceptance.
- .3 Staff trained technologists who monitor the System Continuously.
- .4 Create a Case Number when an action is required.
- .5 Disable and enable some system devices for Servicers who go to the site when intervention needed.

- .6 Verify service of Event.
- .7 Provide Performance Reports for SmartZone via the Customer Support Manager.
- .8 Order and maintain dedicated lines for remote diagnostic capability.
- 11.0 Customer has to the following responsibilities:
  - .1 Allow Motorola remote access to receive and evaluate System performance data without notification to Customer.
  - .2 Notify the System Support Center when Customer performs any activity that impacts the system.
  - .3 Allow Servicers access to Equipment if remote service is not possible.
  - .4 Provide information necessary to complete Customer Support Plan.

## OnSite Infrastructure Response

## 1.0 Description of Service

OnSite Infrastructure Response provides for on-site technician response as follows: Trunked system infrastructure including but not limited to site controller and remote site controllers, if proposed, base repeaters, antenna systems, communications center equipment and critical control stations as identified in the Customer Support plan, satellite receiving equipment, and simulcast equipment, shall be provided service twenty-four hours per day, seven days a week. Response times shall be in accordance with, Table A, herein. Response is defined as having a factory certified technician on-site at the Customer's facility where the failure occurred.

Motorola's Infrastructure Repair Service will provide the Customer with two (2) specially selected system technicians who will apply the vital and commensurate skills to the Customer's system. These dedicated system technicians will ensure the correct expertise is applied to the Customer system. This means that, when configuring Infrastructure Repair Service, Motorola will carefully match the skills, experience, and expertise of system technicians with the specific support requirements.

A system technician will be dispatched to all Customer sites in a timely and efficient manner to meet the agreed-upon response times for on-site repairs. Repair service will be provided during regular business hours, with after-hours service ensured for Severity 1 issues.

Motorola's response times are listed in Table A herein.

## 2.0 Motorola has the following responsibilities:

- Provide both Remote Technical Support and On-Site Infrastructure Response.
- 2.2 Provide materials, tools, documentation, physical planning manuals, diagnostic and test equipment necessary to perform the Maintenance service.
- 2.3 Perform one annual System Survey and Analysis to be scheduled at a time mutually convenient to the Customer and Motorola.

- 2.4 Comply with Customer requirements for safety training to access communication sites.
- 2.5 After the ESS period, If Motorola is providing both Remote Technical Support and On-Site Infrastructure Response, Motorola will ordinarily first respond in accordance with the ESS Statement of Work and Table C. If in the performance of the Technical Support responsibilities, Motorola determines that an on site technician is necessary, dispatch will occur promptly and when such determination is made, then on site response will occur in accordance with Table C. If Motorola is not providing Technical Support but only providing On-Site Infrastructure Response, Motorola will respond in accordance with this ESS Statement of Work and Table A.
- 3.0 Customer has the following responsibilities:
  - 3.1 Establish and maintain a suitable environment for the Equipment and provide the Servicer full, free, and safe access to the Equipment so that the Servicer may provide Maintenance services.

## System Survey and Analysis

## 1.0 Description of Service

Motorola's System Survey and Analysis will provide one (1) annual operational test and alignment, as applicable, on the Customer's Equipment (infrastructure or fixed network equipment only) to ensure the Equipment meets original manufacturer's specifications. This service will be provided during a Standard Business Day or during mutually agreed upon times.

- 2.0 Motorola has the following responsibilities:
  - .1 Physically inspect the infrastructure Equipment in the System (equipment cabinet, general circuitry, and connections).
  - .2 Remove any oil, dust, and/or foreign substances from the Equipment.
  - .3 Clean filters, if applicable.
  - .4 Notify Customer of any possible downtime needed to perform this service.
  - .5 Measure, record, align, adjust the following applicable Equipment parameters, to the frequency and modulation outlined in the Rules and Regulations of the Federal Communications Commission (FCC):
    - .5.1 Transmit Frequency
    - .5.2 Deviation
    - .5.3 Transmitter Power
    - .5.4 Reflected Power in Antenna line
    - .5.5 Combiners and circulator loss
    - .5.6 Receive Sensitivity
    - .5.7 Simulcast parameters and equipment

- 2.6 Inspect Microwave System and perform proper alignment of the Microwave System.
- 2.7 Inspect the operational parameters and output levels and provide maintenance of the Dispatch Consoles.
- 2.8 Inspect and provide periodic preventative maintenance of the Generators and Auxiliary Power as recommended by manufacturers.
- 3.0 Customer has the following responsibilities:
  - .1 Provide preferred schedule for System Survey and Analysis to Motorola.
  - .2 Cooperate with Motorola and perform all acts that are reasonable or necessary to enable Motorola to provide the System Survey and Analysis services to Customer.
  - .3 Approve any planned System downtime.

## Software Subscription Agreement

1.0 Description of Service

Motorola provides Software releases by means of a Software Subscription Agreement ("SSA"). As more thoroughly discussed in the SSA, Motorola will provide to Customer periodic bulletins which announce and explain available Enhancement Releases and Core Releases for Motorola Software for use with upgrade-capable Motorola Equipment covered by the SSA. This is a summary of the Software Subscription Agreement that is provided as part of ESS.

- 2.0 Motorola must provide services in accordance with the SSA
- 3.0 Customer must provide support in accordance with the SSA.

#### Infrastructure Software Installation

1.0 Description Of Service

Infrastructure Software Installation provides the technical resources to install and activate one (1) Enhancement Release during the ESS period. During the Warranty Period, if the installation of an Enhancement Release is necessary to correct an error or malfunction in the Software, Motorola shall provide the installation at no charge.

- 2.0 Motorola has the following responsibilities:
  - .1 Install Enhancement Releases that have been provided pursuant to a Motorola Software Subscription Agreement.
  - .2 Install additional hardware as required by the Enhancement Release.
- 3.0 Customer has the following responsibilities:

- .1 Purchase additional System equipment needed to implement an ordered Enhancement Release.
- .2 Inform System users of upgrade plans and scheduled System downtime.

## Software Upgrade Design

## 1.0 Description of Service

Software Upgrade Design includes design services for Enhancement Releases only. Motorola will review System audit data along with an Equipment List to ensure there will be no Software incompatibilities between equipment that is not being upgraded versus equipment which is being upgraded with an Enhancement Release. Motorola will identify additional equipment and engineering that is required as a result of the upgrade and will recommend a plan for installation.

- 2.0 Motorola has the following responsibilities:
  - .1 Collect and/or update Infrastructure System audit data as needed.
  - .2 Identify additional System equipment needed to implement an Enhancement Release.
  - .3 Complete a proposal defining the Enhancement Release, equipment requirements, installation plan, and impact to System users, that will fulfill the Customers upgrade requirements.
  - Advise Customer of System impact to System users during the actual field upgrade implementation.
- 3.0 Customer has the following responsibilities:
  - .1 Contact Motorola upon receiving a bulletin to engage the appropriate Motorola resources for an Enhancement Release or Core Release.
  - .2 Maintain and provide subscriber equipment templates.

## Response Times, Restoration Times, and Severity Definitions Tables

TABLE A
OnSite Infrastructure Response Times

SEVERITY	RESPONSE (On-Site Arrival)	
Severity 1	2 Hours from notification	
Severity 2*	4 Hours from notification	
Severity 3*	24 hours from notification	

<sup>\*</sup> Standard Business Day

TABLE B
Remote Technical Support Response Times

SEVERITY	RESPONSE	
Severity 1	Within 1 Hour from receipt of notification	
Severity 2*	Within 4 Hours from receipt of notification	
Severity 3 *	Within next Business Day	

Standard Business Days

TABLE C
OnSite Infrastructure Response
with Remote Technical Support Response Times

SEVERITY	RESPONSE		
Severity 1	Within 1 Hour from receipt of request for Technical Support On Site within 2 hours from time of dispatch		
Severity 2 *	Within 4 Hours from receipt of request for Technical Support On Site within 4 hours* from time of dispatch*		
Severity 3 *	Within next Business Day from receipt of request for Technical Support* On Site within 24 hours* from time of dispatch		

<sup>\*</sup>Standard Business Day

# TABLE D Restoration Response

Severity	Restoration
Severity 1*	If requested by the Customer, within 4 hours from receipt of notification of Severity 1 condition, Motorola shall meet with the Customer and will develop a written plan that is acceptable to Customer. The plan shall be submitted as agreed to during the meeting and shall state how Motorola plans to restore the System or resolve the issue and must at a minimum include the resources Motorola plans to use and where those resources will be located. In the event that Motorola's plan is not acceptable to Customer, Motorola shall within 2 hours submit a plan that is acceptable to Customer. At the Customer's discretion, these deadlines may be extended for extenuating circumstances.
Severity 2 *	If requested by the Customer, within 8 hours from receipt of notification of Severity 2 condition, Motorola shall meet with the Customer and will develop a written plan that is acceptable to Customer. The plan shall be submitted as agreed to during the meeting. The plan shall state how Motorola plans to restore the System or resolve the issue and must at a minimum include the resources Motorola plans to use and where those resources will be located. In the event that Motorola's plan is not acceptable to Customer, Motorola shall, within 4 hours, submit a plan that is acceptable to Customer. At the Customer's discretion, these deadlines may be extended for extenuating circumstances.
Severity 3*	If requested by the Customer, within 2 business days from receipt of notification of Severity 3 condition, Motorola shall provide a written plan that is acceptable to Customer. The plan shall state how Motorola plans to restore the System or resolve the issue and must at a minimum

Enhanced System Support City of Austin Regional Trunked Radio Project

_	
	include the resources Motorola plans to use
	and where those resources will be located.
	In the event that Motorola's plan is not
	acceptable to Customer, Motorola shall,
	within 1 day, submit a plan that is
	acceptable to Customer. At the Customer's
	discretion, these deadlines may be extended
	for extenuating circumstances.

<sup>\*</sup> Standard Business Day

## <u>TABLE E</u> Severity Definitions

#### **SEVERITY 1 EVENTS**

#### Events

Database Server Down (default subscriber records)

Audio Switch Down (remote sites in Site Trunking, no wireline console)

Zone Controller Down (all sites in site trunking mode, no wireline consoles)

#### Ambassador Board Down

#### Sites Down, Site Trunking or Site in Failsoft

• Occurrence >= 5 minutes, 3 occurrences in 30 minutes, 5 occurrences in 60 minutes

#### Severity 2 Devices – if 33% or greater Down

#### Channels – if 33% of a Site Channels are Down

#### Prime Controller A Major

- Loss of power to the central controller.
- Loss of one or more of the dc power voltages.
- Failure of site controller boards or loss of communications with any of these boards
- Failsoft operation.

#### Prime Controller B Major Alarm

- Loss of power to the central controller.
- Loss of one or more of the dc power voltages.
- Failure of site controller boards or loss of communications with any of these boards
- Failsoft operation

#### Major Microwave Alarm

#### High Temperature Alarm

AC Power Generator "A" On Alarm

Site AC Power Surge Protector Failure

AC Power Generator "A" Oil Alarm

AC Power Generator "A" Temperature Alarm

## SEVERITY 1 EVENTS - Customer Notification Only, Response Not Needed

Events	
Site Door Access Alarm	
Smoke Detector Alarm	
AC Generator "A" Fuel Low Alarm	
Prime Controller A Cabinet Access Alarm	
Prime Controller B Cabinet Access Alarm	

#### SEVERITY 2 EVENTS

Zone Manager Down

User Server Down (reduction of zone manager sessions)

CEB Issues

DIU - Single Channel Down

Quantar IFComAlrm - Inter ace to Quantar Communication Failed

Quantar Rx 1 Alarm - Receive 1 Alarm

Quantar Rx 1 Lock - Receive 1 VCO Lock Alarm

Quantar WL Stat - Wire ine Module Alarm

Quantar ACPw - AC Power Fail Alarm (Battery Option Onl

Quantar ACPw - Power Amp ter Fail Alarm

Quantar Tx Lock - Transmit VCO Lock Alarm Lock

Prime Controller A Minor Alarm

Prime Controller B Minor Alarm

Microwave Minor Alarm

Prime Controller A Controller Active

Prime Controller B Controller Active

MOSCAD I/O Mod Fa' - I/O Module Failure

MOSCAD Battery Fa ure - Battery power in system has ailed.

Simulcast Site Frequency Standard Rubidium Lock Loss GPS Alarm

Simulcast Site Frequency Standard AC Power Fa' ure GPS Alarm

Simulcast Site Frequency Standard RF Fault GPS Alarm

Monitoring Unit (MOSCAD) Reset

Microwave Alarm

MOSCAD Fa' - RTU Communication Failure - between remote sites

#### SEVERITY 3 EVENTS - Customer Notification Only, Response Not Needed

#### Events

Non-Emergency or Technical Questions

## Enhanced System Support

#### Terms and Conditions for ESS

#### SECTION 1 SERVICE DESCRIBED

- A. Motorola agrees to provide services for the Equipment in accordance with the following standards: (i) provide parts that are new and unused and in first class condition or recycled items, and not reconditioned; (ii) the Equipment will be serviced at levels set forth in Motorola's product manuals; and (iii) service procedures that are prescribed from time to time by Motorola for its products will be followed.
- B. Motorola may also provide additional services ("Above-Contract Services") at Customer's request that will be billed at Motorola's then applicable service rates, provided Customer preapproves the service rate charges.
- C. Customer must maintain, and upon request by Motorola, provide a complete equipment list indicating serial numbers, model numbers, location of Infrastructure Equipment, and whether any Equipment is labeled intrinsically safe for use in hazardous environments.
- F. Customer must notify Motorola when it becomes aware of any material Equipment failure.
- G. Motorola and Customer will jointly prepare and maintain a Customer Support Plan. Customer agrees to provide all information which is necessary to maintain the Customer Support Plan.

## SECTION 2 EXCLUDED SERVICES

- A. Service does not include the repair or replacement of Equipment that has become defective or damaged due to physical or chemical misuse or abuse from causes such as lightning, power surges, or liquids exceeding manufacturer's specifications. Motorola provided lightning and surge protection devices are not excluded.
- B. Motorola has no obligation or responsibility for any transmission medium not provided by Motorola such as telephone lines, computer networks, or the worldwide web, or for Equipment malfunction caused by such transmission medium.
- C. Unless specifically included in writing executed by Motorola, Service of Equipment does not include items that are consumed in the course of normal operation of the Equipment, such as, but not limited to, batteries, magnetic tapes, and computer supplies.
- D. ESS does not include reprogramming of Equipment unless part of an Enhancement Release, replacement, or repair.

#### SECTION 3 TIME AND PLACE OF SERVICE

Service will be provided at the location specified in the ESS Statement of Work. When Motorola performs service at the Equipment's location, Customer agrees to provide Motorola, at no charge, a non-hazardous environment for work with shelter, heat, light, and power and with full and free access to the Equipment. Customer will provide all information pertaining to the hardware and software elements of any system with which the Equipment is interfacing that enable Motorola to perform its obligations under this ESS program. Unless otherwise stated in the ESS Statement of

Work, the hours of service will be the hours of 8:00 a.m. to 4:30 p.m., local time, excluding weekends and holidays. Customer will pay any charges associated with helicopter or other unusual access requirements or expenses that Customer pre-approves in writing.

#### SECTION 4 WARRANTY

Motorola warrants that its services under this ESS program will be free of defects in materials and workmanship for the remainder of the Warranty Period or for a period of ninety (90) days from the date of performance, whichever is longer. MOTOROLA DISCLAIMS ALL IMPLIED WARRANTIES OR CONDITIONS, INCLUDING THE IMPLIED WARRANTIES OR CONDITIONS OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

#### **SECTION 5 PENALTIES**

In the event that Motorola fails to respond when notified by the City within the time stated herein, Motorola shall credit the City's account as indicated below for post Warranty maintenance services provided by Motorola for the System.

## On-Site Response Time

Response time is measured from the time a Case Number is issued by Motorola's System Support Center to the time of technician arrival.

Severity 1 Event - Failure to respond in 2 hours = \$200 credit per incident.

Severity 1 Event – Failure to respond in 4 hours = \$300 credit per incident.

Severity 1 Event – Maximum credit to Maintenance Contract = \$500 per incident.

Severity 2 Event - There will be no penalty for failure to timely respond to minor failures because, by definition, such failures do not prevent material use of the system.

#### Failure to Ship Equipment for Repair

Ship time is measured from the time in the Case Number log entry when the part is ordered to the time of arrival of the part at a mutually agreed upon destination.

Failure to ship within 24 hours – Severity 1 Outages = \$500 per day, not to exceed \$2500 credit

Failure to ship within 24 hours – Severity 2 Outages = There will be no penalty because Severity 2 outages do not prohibit use of the system.

#### Failure To Return a Repaired Mobile or Portable

Return time is measured from the time a Mobile or Portable is entered in Motorola's local

tracking log to the time the repaired Mobile or Portable is returned to a mutually agreed upon destination.

Repairs over 5 business days = \$10 credit per unit per incident.

Repairs over 20 business days = Motorola shall provide at no cost a comparable Loaner Mobile or Portable for the Customer's use until the original Mobile or Portable is repaired and returned to Customer.

## Failure To Return a Part or Field Replaceable Unit (FRU)

Return time is measured from the time the return authorization number is issued to the time the repaired part or FRU is returned to a mutually agreed upon destination.

Returns over 5 days = \$100 credit per unit per incident.

Repairs over 20 business days = Motorola shall exchange a part or field replaceable unit for the Customer's use at no cost.

Sample

**Exhibit D-1** 

Service Agreement 911 RDMT Radio Project

#### SERVICE AGREEMENT

THIS SERVICE AGREEMENT, is entered into between Motorola, Inc.. a Delaware corporation ("Motorola") and the City of Austin, Texas, a Texas home-rule municipal corporation ("Customer") effective as of the last date signed below ("the Effective Date").

#### Section 1 DEFINITIONS

"Service Agreement" means this Service Agreement and its Attachments; "Equipment" means, collectively and in part, the communication equipment that is specified in the Attachments or that is subsequently added to this Service Agreement.

#### Section 2 ACCEPTANCE

The terms and conditions set forth in this Service Agreement and in Attachments will become the Service Agreement only when acknowledged and accepted in writing by Motorola's Schaumburg, Illinois Service Department and the City of Austin.

#### Section 3 SERVICE DEFINED

- A. Motorola agrees to provide services ("Services") for the Equipment as specified in the Attachments and in accordance with the following standards: (i) Motorola parts or parts of equal quality that are new and unused and in first class condition or recycled items and not used or reconditioned will be used; (ii) the Equipment will be serviced at levels set forth in Motorola's product manuals; and (iii) routine service procedures that are prescribed from time to time by Motorola for its products will be followed.
- B. All communication equipment purchased by Customer from Motorola ("Additional Equipment") that is part of the same communications system or of similar type as the Equipment covered under this Service Agreement will be automatically added to this Service Agreement and will be billed at the applicable rates after the warranty period has expired. Motorola may also provide additional services ("Above-Contract Services") at Customer's request that will be billed at Motorola's then applicable service rates.
- C. All Equipment must be in working order on the Effective Date of the Service Agreement or at the time the Equipment is added to the Service Agreement. Customer must provide a complete serial number and model number list either prior to the Effective Date or prior to the time that the Equipment is added to the Service Agreement and must indicate in the Attachments any Equipment that is labeled intrinsically safe for use in hazardous environments.
- D. Customer must notify Motorola in writing when it learns that any Equipment is lost, damaged, or stolen. Customer's obligation to pay Service fees for such Equipment will terminate at the end of the month in which Motorola receives such written notice.
- E. If Equipment cannot, in Motorola's opinion, be properly or economically serviced for any reason including excessive wear, unavailability of parts, the state of technology, or the practical feasibility of the scope of Services as specified in the Attachments or Motorola Statement of Work, Motorola may, with Customer prior approval: (1) modify the scope of Services related to such Equipment; (2) remove such Equipment from Service Agreement; or (3) change the price to Service such Equipment.

F. Customer must notify Motorola or Motorola's Subcontractor immediately of any Equipment failure. Motorola will respond to Customer's notification in a manner consistent with the level of service purchased as indicated in the Attachments.

#### Section 4 EXCLUDED SERVICES

- A. Service does not include the repair or replacement of Equipment that has become defective or damaged due to physical or chemical misuse or abuse from causes such as lightning, power surges, or liquids that are not caused by Motorola.
- B. Unless specifically included in the Attachments, Service does not include repair or maintenance of any transmission line, antenna, tower or tower lighting, duplexer, combiner, or multicoupler. Motorola has no obligation or responsibility for any transmission medium not covered by the Service Agreement, such as telephone lines, computer networks, or the worldwide web, or for Equipment malfunction caused by such transmission medium.
- C. Unless specifically included in the Attachments, Service of Equipment does not include items that are consumed in the course of normal operation of the Equipment, such as, but not limited to, batteries, magnetic tapes, and computer supplies.
- D. Service does not include reprogramming of Equipment; accessories, belt clips, or battery chargers; custom or Special Products; modified units; or software.
- E. Service does not include certification programs, software support, reprogramming, or modifications to Equipment related to assuring the correct processing, providing, or receiving of date data from, into, or between the year 1999 and the year 2000.

## Section 5 NO RIGHT TO SUBCONTRACT/ASSIGNMENT

- A. Motorola has identified Subcontractors in its Compliance Plan for the System, therefore Motorola shall comply with the provisions of Chapter 5-7 of the Austin City Code of 1992, as amended, and the terms of the Compliance Plan as approved by the City (the "Plan"). Motorola shall not initially employ any Subcontractor except as provided in Motorola's Plan. Motorola shall not substitute any Subcontractor identified in the Plan, unless the substitute has been accepted by City in writing in accordance with the provisions of Chapter 5-7. No acceptance by City of any Subcontractor shall constitute a waiver of any rights or remedies of City with respect to defective deliverables provided by a Subcontractor. If a Plan has been approved, Motorola is additionally required to submit a monthly Subcontract Awards and Expenditures Report to the project manager or contract manager no later than the tenth calendar day of each month.
- B. The Agreement shall be binding upon and inure to the benefit of Customer and Motorola and their respective successors and assigns; provided, however, that no right or interest in the Agreement shall be assigned and no obligation shall be delegated by Motorola without the prior written consent of Customer. Such consent will not be unreasonably withheld. Any attempted assignment or delegation by Motorola shall be void unless made in conformity with this paragraph. The Agreement is not intended to confer rights or benefits on any person, firm or entity not a party hereto; it being the intention of the parties that there be no third party beneficiaries to the Agreement. Subcontracts will be entered into in accordance with the terms of this Agreement. Notwithstanding the foregoing, Motorola may assign its right to receive payments due to Motorola hereunder with the consent of Customer. Customer will not be bound by any such assignment until written notice thereof has been delivered to Customer.

#### Section 6 TIME AND PLACE OF SERVICE

Service will be provided at the location specified by Customer in the Attachments. When Motorola performs service at the Equipment's location, Customer agrees to provide Motorola, at no charge, a non-hazardous environment for work with shelter, heat, light, and power and with full and free access to the Equipment. Customer will provide all information pertaining to the hardware and software elements of any system with which the Equipment is interfacing that enable Motorola to perform its obligations under this Service Agreement. Unless otherwise specified in the Attachments, the hours of Service will be hours of 8:00 a.m. to 4:30 p.m., local time, excluding weekends and Motorola and Customer observed holidays.

#### Section 7 PAYMENT

Motorola will invoice Customer in advance for each payment period. All other charges will be billed monthly, and Customer must pay each invoice within thirty (30) days of the invoice date to the Motorola office designated by Motorola. Motorola does not by this Agreement make any price guarantees except as stated in the Order Form.

#### Section 8 WARRANTY

Motorola warrants that its Services under this Service Agreement will be free of defects in materials and workmanship for a period of ninety (90) days beyond the expiration or termination of this Agreement. Customer's remedies are to require Motorola to re-perform the affected Service or to refund, on a pro-rata basis, the Service fee paid for the affected Service. MOTOROLA DISCLAIMS ALL IMPLIED WARRANTIES INCLUDING, WITHOUT LIMITATION, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

#### Section 9 CERTIFICATION DISCLAIMER

Unless signed by a Motorola authorized signatory, Motorola specifically disclaims all certifications regarding the manner in which Motorola conducts its business or performs its obligations under this Service Agreement.

#### Section 10 DEFAULT/TERMINATION

#### A DEFAULT

If Motorola 1) fails to timely complete and perform its material obligations or duties in the performance of this Agreement, 2) fails to provide adequate written assurance of performance upon the demand of City; 3) becomes insolvent or seeks relief under the bankruptcy laws of the United States; or 4) makes fraudulent statements to the City in relation to the Project ("Event of Default"), Motorola shall be in default of this Agreement. City agrees to give Motorola written notice of such default. Motorola will have thirty (30) days from the receipt of such notice either to cure the default or to provide a plan of action that is acceptable to City to cure the default. In the event that the City determines the plan is unacceptable or Motorola fails to cure the default, the City shall have the right to terminate the Agreement for cause.

#### B TERMINATION WITH CAUSE

If Motorola fails to timely cure the Event of Default or fails to submit a plan of action that is acceptable to the City, City may terminate this Agreement for cause, in whole or part, by giving written notice to Motorola. Additionally, if the City terminates this Agreement for cause, the

City may remove Motorola from the City's vendor list for three (3) years and any competitive bid response submitted by Motorola to City may be disqualified for up to three (3) years.

#### C DAMAGE UPON DEFAULT

Motorola is liable for any damages, costs, losses, and expenses incurred by the City as a result of Motorola's default including without limitation, actual damages, costs, cost of cover, reasonable attorneys' fees, court costs, prejudgment interest and post-judgment interest at the maximum lawful rate. City agrees to use its best efforts to mitigate such damages and costs. Motorola's liability under this Section is subject to the limitations of the Section entitled Limitation of Liability of this Agreement. City is entitled to pursue any other remedy available at law or equity. The City shall have no financial obligation to compensate Motorola for terminated Services performed after the Notice of Termination. THE REMEDIES PROVIDED IN THIS SECTION OF THE AGREEMENT WILL BE THE FULL EXTENT OF THE CITY'S REMEDIES IN THE EVENT OF DEFAULT.

#### D TERMINATION WITHOUT CAUSE

City shall have the right to terminate this Agreement, in whole or in part, without cause any time upon thirty (30) days' prior written notice. Upon receipt of a notice of termination, Motorola shall promptly cease all further work pursuant to the Agreement, with such exceptions, if any, specified in the notice of termination. Title to Software shall not pass to City at any time. City shall be liable to Motorola for Equipment and Services provided to the date of notice to terminate and for reasonable, allowable, and allocable costs incurred by Motorola in the termination of subcontracts, removal of installation, and test equipment, and other costs directly related to an unforeseen and abrupt termination without cause by City. Motorola shall submit documentation to support all claimed costs.

If Motorola timely submits sufficient documentation and City approves thereof, City shall pay Motorola, to the extent of funds Appropriated or otherwise legally available for such purposes and not otherwise recoverable from other sources by Motorola, for all Deliverables received and Services performed and obligations incurred prior to the date of termination and for reasonable, allowable, and allocable costs incurred by Motorola in the termination of subcontracts, removal of installation, and test equipment, and other costs directly related to an unforeseen and abrupt termination without cause by City. In no event, shall the City be liable for any loss of profits on the terminated portion of this Agreement. The rights and remedies of the City provided in this section shall not be exclusive and are in addition to any other rights and remedies provided by law or equity.

- E. Any dispute will be resolved by mutual agreement.
- F. Neither party shall be liable for any default or delay in the performance of its obligations under this Agreement if, while and to the extent such default or delay is caused by acts of God, unusual weather conditions, fire, riots, labor disruptions, sabotage or any other cause beyond the reasonable control of such Party ("Force Majeure"). In the event of default or delay in contract performance due to any of the foregoing causes, then the time for completion of the services will be extended by a mutually agreeable period of time reasonably necessary to overcome the effect of such failure to perform.

#### Section 11 LIMITATION OF LIABILITY

Notwithstanding any other provision, Motorola's total liability for losses, whether for breach of contract, negligence, indemnity, warranty, or strict liability in tort, is limited to the price of twelve months of Services sold. IN NO EVENT WILL MOTOROLA BE LIABLE FOR LOSS OF USE, LOSS OF TIME, INCONVENIENCE, COMMERCIAL LOSS, LOST PROFITS OR SAVINGS, OR OTHER INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES IN THE PERFORMANCE OF SERVICES BY MOTOROLA PURSUANT TO THIS AGREEMENT.

#### Section 12 TERMS AND CONDITIONS

- A. Customer acknowledges that the Service Agreement supersedes all prior and concurrent agreements and understandings, whether written or oral, related to the services performed. The Service Agreement or Attachments may not be altered, amended, or modified except by a written agreement signed by both parties.
- B. Customer agrees to reference this Service Agreement on all purchase orders issued pursuant to this Service Agreement. Neither party will be bound by any terms contained in Customer's purchase order or elsewhere (even if it is attached to the Service Agreement). In the event of a conflict between the main body of this Service Agreement and any Addenda or Attachments, the main body of this Service Agreement will take precedence, unless the Addendum or Attachment specifically states otherwise.

#### Section 13 FCC LICENSES AND OTHER AUTHORIZATIONS

Customer is solely responsible for obtaining licenses or other authorizations required by the Federal Communications Commission ("FCC") or any other federal, state, or local government agency and for complying with all rules and regulations required by such agencies. Neither Motorola nor any of its employees is an agent or representative of Customer in any governmental matters.

#### Section 14 OWNERSHIP OF INTELLECTUAL PROPERTY

- A. This Service Agreement does not grant directly or by implication, estoppel, or otherwise, any ownership right or license under any Motorola patent, copyright, trade secret, or other intellectual property including any intellectual property created as a result of or related to the products sold or Services performed under this Service Agreement.
- B. Motorola reserves the right to limit access to its confidential and proprietary information including cost and pricing data.

#### Section 15 GENERAL TERMS

A. Severability: The invalidity, illegality, or unenforceability of any provision of the agreement shall in no way affect the validity or enforceability of any other portion or provision of the agreement. Any void provision shall be deemed severed from the agreement and the balance of the agreement shall be construed and enforced as if the agreement did not contain the particular portion or provision held to be void. The parties further agree to reform the agreement to replace any stricken provision with a valid provision that comes as close as possible to the intent of the stricken provision. The provisions of this section shall not prevent this entire agreement from being void should a provision, which is the essence of the agreement, be determined to be void.

- B. Jurisdiction and Venue: This Service Agreement is made under and shall be governed by the laws of the State of Texas, including, when applicable, the Uniform Commercial Code as adopted in Texas, V.T.C.A. Bus. & Comm. Code, Chapter 1, excluding any rule or principle that would refer to and apply the substantive law of another state or jurisdiction. All issues arising from this Agreement shall be resolved in the courts of Travis County, Texas and the parties agree to submit to the exclusive jurisdiction of such courts. The foregoing, however, shall not be construed or interpreted to limit or restrict the right or ability of Customer to seek and secure injunctive relief from any competent authority as contemplated herein.
- C. Waiver: Failure or delay by either party to exercise any right or power under this Agreement will not operate as a waiver of such right or power. No claim or right arising out of a breach of the Agreement can be discharged in whole or in part by a waiver or renunciation of the claim or right unless the waiver or renunciation is supported by consideration and is in writing signed by the aggrieved party. No waiver by either Motorola or Customer of any one or more events of default by the other party shall operate as, or be construed to be, a permanent waiver of any rights or obligations under the Agreement, or an express or implied acceptance of any other existing or future default or defaults, whether of a similar or different character.
- D. Effective Date: The Service Agreement will begin on the Effective Date specified in the Attachments. This Service Agreement may be renewed for an additional one year term by agreement of the parties, on every anniversary of the Start Date.
- E. Taxes: Purchases of Deliverables for City use are usually exempt from City, State, and most Federal Taxes. Prices should not include exempted taxes. A Tax Exemption Certificate will be provided to Motorola upon request from the Purchasing Office. Under no circumstances shall the City be liable to pay exempt taxes under this Agreement.
- F. If Motorola provides Service after the termination or expiration of this Agreement, the terms and conditions and any prices in effect at the time of the termination or expiration will apply to that Service.

Customer	Motorola, Inc.
By:	By:
Name:	Name:
Title:	Title:
Date:	Date:

## Exhibit D-2

# Software Subscription Agreement 911 RDMT Radio Project

#### EXHIBIT D-2

#### SOFTWARE SUBSCRIPTION AGREEMENT

This Motorola Software Subscription Agreement ("Agreement" or "SSA") is between Motorola, Inc., a Delaware corporation ("Motorola") by and through its Commercial, Government, Industrial Solutions Sector (CGISS) and the City of Austin, a Texas home-rule municipal corporation ("Customer").

#### Section 1 DEFINITIONS

"Communications System" or "System" is the 800 MHz Trunked Radio Communications System described, including the Equipment, Software, Documentation, and System installation provided in the System Description, Statement of Work, Acceptance Test Plan, and Equipment List.

"Core Release" – A new version of Software which adds Features and major enhancements. These new versions are signified by changes to the first digit of the version identifier number (e.g. SmartZone 2.0.3 to SmartZone 3.0).

"Enhancement Release" – A superseding issue of Software which adds to, improves, or enhances the performance of Software Features contained in the then currently shipping Software version. These releases are signified by changes to the second digit of the version identifier number (e.g. SmartZone 3.1 to SmartZone 3.2).

"ESS Period" -- The 12 month period commencing at the start of the Warranty Period for Equipment, Services, and Software as defined by the Communications System Agreement.

"Feature" - A Software functionality.

"Optional Feature" - An additional software functionality issued with a Core Release that is available to Customer at additional cost.

"Standard Feature" – An additional software functionality for components of Customer's system that is available to Customer in the standard software release.

"Special Product Feature" - Features specially developed for Customer which contain Customer unique functionality.

#### Section 2 SUBSCRIPTION PROGRAM

During the term of this Agreement, Motorola will provide Customer with the software subscription services described below ("Software Subscription Program") for upgrade capable Motorola infrastructure equipment (including console equipment) that is in the Customer configuration identified in Appendix A to this Agreement. Non-Motorola manufactured software, Non-CGISS software, and Radio Service Software (RSS), are excluded from the Software Subscription Program.

- A. Motorola will provide periodic Motorola Software Enhancement Releases applicable to Features currently provided to Customer by Motorola under a Software License Agreement. Customer is responsible for the purchase of additional hardware that is necessary to upgrade to the newly issued Enhancement Release.
- B. Motorola will provide those Standard Features included in a Core Release which apply to Customer's existing system components. Customer is responsible for the purchase and license of additional products, hardware, and/or software that are necessary to migrate to the newly issued Core Release.
- C. Optional Features issued with a Core Release are not provided pursuant to the Software Subscription Program but are available to Customer, as a Program subscriber, at a discounted price under a separate agreement. The discount available to Customer for voice system Optional Features will be 20% off the current Motorola list price. The discount available to Customer for data system Optional Features will be 15% off the current Motorola list price. Once an Optional Feature is provided to Customer, Customer will be entitled under this Agreement to all Enhancement Releases for that Optional Feature.
- D. Special Product Features previously developed by Motorola unique to Customer's system may require additional engineering effort to be incorporated into a Enhancement Release or Core Release so that the Special Product Feature will not be overwritten upon its installation. Upon request, Motorola will determine whether a Special Product Feature can be incorporated into a Enhancement Release or Core Release and whether additional engineering effort is required. Customer will be responsible for all charges associated with any additional engineering required for each Enhancement Release or Core Release that it chooses to install. Such equipment and engineering are not included as part of the Software Subscription Program and may be provided pursuant to a separate agreement.
- E. Motorola will issue to Customer at the below address bulletins including electronic copies announcing Enhancement Releases and Core Releases. If Customer desires to obtain the announced Enhancement Release or Core Release, it must contact its Motorola representative. If needed, Customer should contact its local service provider for installation assistance.

Customer Contact for Bulletin Receipt

Customer City of Austin, Wireless Communications Services Officer

Address: 1006 Smith Road, Austin, Texas 78721

Attn: Mr. Mike Simpson Wireless Communications Services Officer

- F. Because Enhancement Releases may include minor performance enhancements, Customer is encouraged to periodically upgrade the Motorola Software operating on its System with the most current Enhancement Release (e.g. SmartZone 3.0.1 to SmartZone 3.0.2). Customer may choose not to install a new software release, however, customer acknowledges that by so choosing, it may limit or eliminate the applicability of future releases to its system.
- G. Because the Software Subscription Program includes Enhancement Releases for only the currently shipping software version and those prior versions that Motorola may be supporting during the term of the Agreement, Customer is encouraged to migrate the Motorola Software operating on its Communications System to the most current Core Release (e.g. SmartZone

2.0.3 to SmartZone 3.0). If Customer's system is not maintained to a currently supported software version, all Core Releases and Enhancement Releases may not be compatible with Customer's existing System. Additional hardware, Motorola Software, and engineered modifications may be required if Customer desires to migrate to a particular Core Release or Enhancement Release. Such additional hardware, Motorola Software and engineering are not included as part of the Software Subscription Program and may be provided pursuant to a separate agreement. If the size and complexity of Customer's System warrants, Motorola may provide consultation services to determine the technological, operational and financial impact of installing a particular Core Release or Enhancement Release on the System, pursuant to a separate agreement.

#### Section 3 FEES AND PAYMENT

Appendix A contains the annual SSA Program fees and payment terms. The fees listed are based upon Customer's current Motorola equipment configuration as indicated in Appendix A Customer must promptly notify Motorola of any change in this configuration and Motorola will calculate revised fees (effective at the beginning of the next subscription year) based on the new configuration. Motorola will refund to Customer any amounts previously paid for SSA Program fees that are reduced due to a new configuration. If the SSA program fees are increased due to a new configuration, Customer will pay any additional amounts within thirty days after receipt of an invoice from Motorola. SSA Program fees for ESS Period are included in System price.

#### Section 4 TERM AND TERMINATION

- A. The term of this Agreement is indicated in Appendix A and shall terminate at the expiration of that term unless extended by mutual agreement of the parties.
- B. The Customer may terminate this Agreement at any time prior to the expiration of its term by providing written notice of such termination to Motorola. Such termination will be effective at the next annual anniversary date following Motorola's receipt of the written notice. Motorola will refund to Customer any pre-paid Software Subscription Program fees for the terminated period.
- C. The Agreement will automatically terminate if, at its annual anniversary date, the software version in Customer's then current configuration is no longer supported by Motorola or if Motorola discontinues the Software Subscription Program, in which case Motorola will refund to Customer any pre-paid Software Subscription Program fees for the terminated period. In the event that Motorola discontinues the Software Subscription Program, Motorola shall notify the Customer in writing at least 90 days before the end of the Software Subscription Program.

#### Section 5 TAXES

Purchases of Deliverables for City use are usually exempt from City, State, and most Federal taxes. Prices should not include exempted taxes. A Tax Exemption Certificate will be provided to Motorola, upon request, from the City Purchasing Office. Under no circumstances shall the City be liable to pay exempt taxes under this Agreement.

#### Section 6 EXCLUDED SERVICES

The SSA program does not include repair or replacement of hardware or software defects not corrected by the Enhancement Releases and Core Releases nor does it include repair or replacement of defects resulting from any nonstandard or improper use or conditions or from unauthorized installation of Motorola software.

#### Section 7 OWNERSHIP AND USE OF SOFTWARE

All rights and title to Motorola software furnished to Customer under this Agreement remains vested exclusively in Motorola. Customer's use of such Motorola software is subject to the terms of the Motorola Software License Agreement executed by Customer.

#### Section 8 DEFAULT

After the Warranty Period, Motorola at any time may suspend subscription services or terminate this Agreement if (a) Customer fails to pay any fees within thirty days after such fees are due, (b) Customer fails to correct a breach of this Agreement within thirty days after notice from Motorola of such breach, (c) Customer's right to use Motorola software under a Motorola software license agreement expires or is terminated, or (d) Customer replaces its Motorola communication system with a non-Motorola communication system. Upon such termination, any unpaid SSA program fees will become immediately due and payable.

#### Section 9 LIMITATION OF LIABILITY

MOTOROLA'S TOTAL LIABILITY ARISING FROM THIS SSA AGREEMENT WILL BE LIMITED TO THE AGGREGATE AMOUNT OF SSA FEES PAID TO MOTOROLA BY CUSTOMER. IN NO EVENT WILL MOTOROLA BE LIABLE FOR SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

## Section 10 GENERAL

A. NOTICES: All notices, requests, or other communications required or appropriate to be given under the Agreement shall be in writing and shall be deemed delivered three business days after postmarked if sent by U.S. Postal Service Certified or Registered Mail, Return Receipt Requested. Notices delivered by other means shall be deemed delivered upon receipt by the addressee. Routine communications may be made by first class mail, telefax, or other commercially accepted means. Notices to the Customer and Motorola shall be addressed as follows:

To the City: To Motorola:

City of Austin Motorola, Inc.

Purchasing Office Project Director

Attn: Contract Compliance Manager Attn: Pam Faver

P.O. Box 1088 7700 West Parmer Lane

Austin, Texas 78767-8828 PL 34

Austin, Texas 78729

with a copy to: with a copy to:

City Attorney Motorola, Inc.

City of Austin Contracts and Compliance

P.O. Box 1546 9980 Carroll Canyon Road

Austin, Texas 78767-1546 San Diego, California 92131

or at such other address, and to the attention of such other person or officer as either person may designate in writing.

- B. FORCE MAJEURE: Neither party shall be liable for any default or delay in the performance of its obligations under this Agreement if, while and to the extent such default or delay is caused by acts of God, unusual weather conditions, fire, riots, labor disruptions, sabotage or any other cause beyond the reasonable control of such Party ("Force Majeure"). In the event of default or delay in contract performance due to any of the foregoing causes, then the time for completion of the services will be extended by a mutually agreeable period of time reasonably necessary to overcome the effect of such failure to perform.
- C. SEVERABILITY: The invalidity, illegality, or unenforceability of any provision of the Agreement shall in no way affect the validity or enforceability of any other portion or provision of the Agreement. Any void provision shall be deemed severed from the Agreement and the balance of the Agreement shall be construed and enforced as if the Agreement did not contain the particular portion or provision held to be void. The parties further agree to reform the Agreement to replace any stricken provision with a valid provision that comes as close as possible to the intent of the stricken provision. The provisions of this section shall not prevent this entire Agreement from being void should a provision, which is the essence of the Agreement, be determined to be void.
- D. WAIVER: Failure or delay by either party to exercise any right or power under this Agreement will not operate as a waiver of such right or power. No claim or right arising out of a breach of the Agreement can be discharged in whole or in part by a waiver or renunciation of the claim or right unless the waiver or renunciation is supported by consideration and is in writing signed by the aggrieved party. No waiver by either Motorola or Customer of any one or more events of default by the other party shall operate as, or be construed to be, a permanent waiver of any rights or obligations under the Agreement, or an express or implied acceptance of any other existing or future default or defaults, whether of a similar or different character.
- E. ASSIGNABILITY. The Agreement shall be binding upon and inure to the benefit of Customer and Motorola and their respective successors and assigns; provided, however, that no right or interest in the Agreement shall be assigned and no obligation shall be delegated by Motorola without the prior written consent of Customer. Such consent will not be unreasonably withheld. Any attempted assignment or delegation by Motorola shall be void unless made in conformity with this paragraph. The Agreement is not intended to confer rights or benefits on any person, firm or entity not a party hereto; it being the intention of the parties that there be no third party beneficiaries to the Agreement. Subcontracts will be entered into in accordance with the terms of this Agreement. Notwithstanding the foregoing, Motorola may assign its right to receive payments due to Motorola hereunder with the consent of Customer. Customer will not be bound by any such assignment until written notice thereof has been delivered to Customer.
- F. ENTIRE AGREEMENT. This Agreement (including Appendix A) constitutes the entire agreement of the parties regarding the subject matter of this Agreement and supersedes all prior and contemporaneous agreements and understandings, whether written or oral, relating to such subject matter. This Agreement may be altered, amended, or modified only by a written instrument signed by the duly authorized representatives of both parties.

City of Austin

By: Motorola Inc.

By: Motorola Inc

CONTRACTS AND COMPLIANCE DEPT.

G. GOVERNING LAW: This Agreement will be governed by the laws of the State of Texas.

# Software Subscription Agreement ("SSA") APPENDIX A

## SYSTEM CONFIGURATION

Choose and complete only ONE of the sections below:

I.	. DataTAC System SSA	
	Number of Network Controllers in Operation	
	Number of Data Subscriber Devices in Operation (Forte, VRM, etc.)	
	IP Messaging for DataTAC (Yes / No)	
	RNC Redundancy for DataTAC (Yes / No)	
	Network Management for DataTAC (Yes / No)	
	Mobility Management for DataTAC (Yes / No)	
	Security Services for DataTAC (Yes / No)	
II.	II. SmartZone System SSA (including Consoles)	
	Number of Sites (in addition to the Prime Site)	
	Number of Repeaters in Operation	
	Number of Subscribers in Operation (Mobiles and Portables)	
	OmniLink Operation (Yes / No)	
	Digital Operation (Yes / No)	
III	III. SmartNet System SSA (Single Site or Simulcast)	
	Number of Remote Sites (in addition to the Prime Site)	
	Number of Repeaters in Operation	
	Number of Subscribers in Operation (Mobiles and Portables)	
	Digital Operation (Yes / No)	
IV	IV. Conventional System SSA	
	Number of Repeaters in Operation	
	Number of Subscribers In Operation (Mobiles and Portables)	
	Digital Operations (Yes / No)	
V.	V. Console Only SSA (not required if System SSA is purchased)	
	Number of Operator Positions	
	Number of Channels	
VI	VI Centralink 2000 IISA	

SSA TERM
Beginning of Term (choose one only)
Expiration of existing Subscription Period (renewal)
Immediately upon execution of Software Subscription Agreement
Other (please specify date)
Length of Term (number of years: 1, 2, 3, 4, or 5)
SSA PROGRAM FEES
Annual Fees (before discount)
System SSA Fee
Console Only SSA Fee
CENTRALINK 2000 SSA Fee
SP Coverage Quote
Total Annual Fee (before discount)
Multi-Year Discount Level (choose the discount corresponding to the length of term)
□ 1 Yrs. 0% □ 2 Yrs. 0% □ 3 Yrs. 5% □ 4 Yrs. 5% □ 5 Yrs. 10%
Total Annual Fee (after discount)
Total Fees during Term Chosen
Payment Methods (check only one):
(A) Payment of total Fees due upon execution of SSA
(B) Payment of Annual Fee due upon first day of each subscription year
(C) Other (specify)

## Exhibit E

Payment and Pricing Agreement 911 RDMT Radio Project

SSA TERM				
	rm (choose one only)			
Expiration o	f existing Subscription	n Period (renewal)	_	
Immediately	Agreement			
Other (please	e specify date)		_	
Length of Term	(number of years: 1,	2, 3, 4, or 5)	_	
SSA PROGRAM	M FEES			
Annual Fees (before	ore discount)			
System SSA	Fee		-	
Console Onl	y SSA Fee		-	
CENTRALI	NK 2000 SSA Fee		_	
SP Coverage	Quote			
Total Annual Fe	e (before discount)		_	
Multi-Year Disco	ount Level (choose the	discount corresponding to	the length of term)	
□ 1 Yrs. 0%	□ 2 Yrs. 0%	□ 3 Yrs. 5%	□ 4 Yrs. 5%	□ 5 Yrs. 10%
Total Annual Fe	e (after discount)		_	
Total Fees durin	g Term Chosen			
Payment Method	ds (check only one):		-	
(A) Payment	of total Fees due up	on execution of SSA	X	
(B) Payment	of Annual Fee due u	ipon first day of each	subscription year_	
(C) Other (sp	becify)			



## INTERLOCAL COOPERATION AGREEMENT FOR MOBILE DATA CAPABILITY AND RADIO NETWORK COMMUNICATIONS BETWEEN TRAVIS COUNTY AND THE CITY OF AUSTIN

This Interlocal Cooperation Agreement is made and entered into by and between Travis County, a political subdivision of the State of Texas, (hereinafter referred to as the "COUNTY"), and the City of Austin, a home rule city and political subdivision of the State of Texas, situated in Travis, Williamson, and Hays Counties, Texas, and hereinafter referred to as the "CITY", for the purposes and consideration herein described.

#### RECITALS

WHEREAS, The COUNTY has entered into a Software License Agreement and Agreement for Implementation of a Mobile Data System and an Automated Reporting System with Tiburon, Inc., attached hereto as Exhibit "A"; and,

WHEREAS, The COUNTY and Tiburon, Inc., have also entered into a Supplemental Agreement amending their Software Maintenance Agreement of October 14, 1997, to cover the software programs licensed under the above referenced license agreement; and,

WHEREAS, the CITY and the COUNTY plan to implement an expanded mobile data network as part of the 9-1-1 RDMT Project in fiscal year 2002, and both parties are interested in an interim solution to meet immediate needs; and,

WHEREAS, the CITY desires that its Police Officers have the electronic ability to pre-book prisoners by use of the CITY of Austin Mobile Data Computer/Terminal System in connection with the COUNTY'S modified Corrections Management System; and,

WHEREAS, Travis COUNTY desires access to the CITY'S Mobile Data Radio Network for use in the COUNTY'S Mobile Data Computers/Terminals to provide the COUNTY full functioning mobile data ability as described in this Interlocal Cooperation Agreement; and,

WHEREAS, the CITY and the COUNTY have agreed that the CITY and the COUNTY will mutually benefit from this Interlocal Cooperation Agreement; and,

WHEREAS, the CITY and the COUNTY intend to conform this Agreement in all aspects with the Interlocal Cooperation Act, Chapter 791 of the Texas Government Code.

NOW, THEREFORE, in consideration of the above stated premises and the mutual covenants and promises contained herein and any other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged by both parties, the parties hereto mutually agree to the following terms, conditions, and provisions.

## SECTION 1 DEFINITIONS

As used in this Interlocal Cooperation Agreement:

- 1.1 "ALE Officer" refers to CITY of Austin Law Enforcement Officers.
- 1.2 "ARS" refers to the COUNTY'S automated reporting system provided by Tiburon in accordance with the Software License Agreement and Agreement for Implementation of a Mobile Data System and an Automated Reporting System, attached hereto as Exhibit "A".
- 1.3 "CAD" refers to Computer Aided Dispatching.
- 1.4 "CMS" refers to the COUNTY'S Corrections Management System.
- "Hardware Modifications" refers only to those enhancements or upgrades to the hardware in the CITY of Austin's Communications Server which are necessary to allow officers of the Travis COUNTY Sheriff's Office and Travis COUNTY Constable Offices access to the CITY'S Mobile Radio Network.
- 1.6 "MDC" refers to the COUNTY'S Mobile Data Computer Systems, including ARS, CAD, CMS and Quickbook.
- 1.7 "MDC/T" refers to the CITY of Austin's Mobile Data Computer/Terminal System.
- 1.8 "MDRN" refers to the CITY'S mobile data radio network which includes the infrastructure that allows MDC/T to transmit data to the CITY or the COUNTY.
- 1.9 "Modified CMS" refers to the COUNTY'S Corrections Management System after software modifications are made to the system as prescribed in the Software License Agreement.
- 1.10 "Quickbook" refers to the County's automated booking sheet as described in the Software License Agreement.
- 1.11 "Software License Agreement" refers to the Software License Agreement and Agreement for Implementation of a Mobile Data System and an Automated Reporting System, and all Exhibits attachments thereto, attached hereto and incorporated herein for all purposes as Exhibit "A".
- 1.12 "TCLE Officer" refers to COUNTY Law Enforcement Officers.

**SECTION 2** 

#### CONSIDERATION

- 2.1 In consideration of its use of the CITY'S Mobile Data Radio Network described in this Agreement, the COUNTY agrees to use its modified CMS to gather data from the MDC/T, so that ALE Officers can pre-book prisoners from the mobile data radio network.
- In exchange for the ability of its ALE Officers to pre-book prisoners from patrol cars, the CITY agrees to allow the COUNTY use of the CITY'S MDRN to transmit data to the COUNTY'S computer systems, including ARS, CAD, CMS and Quickbook.
- 2.3 The CITY and the COUNTY will each expend funds in the performance of their duties and obligations under this Agreement. However, this Agreement does not involve the direct exchange of money between the CITY and the COUNTY. The parties agree that the respective consideration realized by each party under this Agreement is substantially equivalent.
- As stated in Section 9.3 of the Central Booking Interlocal Cooperation Agreement, executed by the CITY and the COUNTY, the CITY and the COUNTY each agree to support their respective associated networks and equipment currently required by the CITY'S Mobile Data Radio Network and COUNTY'S Mobile Data System as provided in this Agreement.

# SECTION 3 QUICK BOOK CAPABILITY

- 3.1 Under this Interlocal Cooperation Agreement, subject to Subsection 3.3 hereof, the CITY of Austin will gain the capability of pre-booking prisoners by use of its MDC/T in connection with the COUNTY'S modified CMS, through Tiburon, as described in Exhibit "A" attached hereto.
- 3.2 Under the Software License Agreement, the COUNTY'S CMS shall be modified by Tiburon at no cost to CITY. COUNTY'S obligation to provide the CITY access to the Central Booking System via the COUNTY'S modified CMS, through Tiburon, is expressly made contingent upon Tiburon's successful modification of the CMS in accordance with the terms, conditions, and provisions of the Software License Agreement and the Exhibits attached thereto.
- The COUNTY shall perform, at the COUNTY'S expense, those Hardware Modifications to the CITY of Austin's Communications Server which are necessary to connect the CITY'S MDC/T to the COUNTY'S modified CMS. COUNTY will not be responsible for any other hardware modifications to the CITY'S Communications Server.
- 3.4 Subject to Subsection 3.3 hereof, ALE Officers will be able to pre-book prisoners by entering data on the CITY'S MDC/T; after which, Central Booking employees will gather such data from the COUNTY'S modified CMS. Central Booking employees will then verify the data in the presence of the arresting officer, and commit the data to Central Booking's database.
- 3.5 Except for an error that is clearly a data entry error by the COUNTY, the CITY is entirely

responsible for the accuracy of data entered by ALE Officers and for any error or inaccuracy in such data. A copy of the Quick Book sheet will be available for the officer.

## SECTION 4 ACCESS TO CITY'S MOBILE DATA RADIO NETWORK

- In consideration for the capability to pre-book prisoners through its MDC/T and the COUNTY'S modified CMS as described in Section 3 hereof, the CITY hereby allows the COUNTY access to the MDRN for use in the COUNTY'S MDC, including ARS, CAD, CMS, and Quickbook, and for no other purposes without the prior written consent of the CITY.
- 4.2 The MDRN will allow the COUNTY up to 50 concurrent MDRN users. Because capacity on the network is limited, the functioning Mobile Data abilities are:
  - 4.2.1 MDC connectivity to Texas Law Enforcement Telecommunications System, and Texas Crime Information Center/National Crime Information Center is available; and
  - 4.2.2 connectivity of COUNTY'S CAD to its MDC to enable dispatching is available.
  - 4.2.3 In addition to these abilities, the COUNTY'S ability to pre-book prisoners is desired, and, real narrative report transmission through ARS is desired; however, such options may be unavailable or limited due to lack of sufficient system capacity.
- 4.3 To enable the COUNTY to gain access to the MDRN, the CITY will provide access to its Communications Server so that the COUNTY, through Tiburon, can make software modifications to enable the CITY'S Communications Server to handle incoming traffic from TCLE Officers and ALE Officers, respectively, and to handle the increased traffic with additional unit identifiers for the COUNTY. The COUNTY shall make software modifications, through Tiburon, to the CITY'S Communications Server at no cost to the CITY so that the server can handle incoming traffic from the ALE Officers and TCLE Officers, respectively, and handle increased traffic with additional unit identifiers for the COUNTY.
- The CITY, at its own expense, will be responsible for all modifications to its MDRN which are necessary to allow COUNTY access to the network as described in this Section 4, except for the specific modifications COUNTY has agreed to make in Section 4.3 above. All modifications made by City shall include both hardware and software associated with the RNC3000 Communications Server.
- 4.5 The CITY, at its own expense, shall continue to be responsible for maintenance of its Communications Server including the Hardware Modifications and/or software modifications made to the server as prescribed by the provisions of this Section 4. Both parties understand that current infrastructure will not be upgraded to increase capacity. System utilization will be

monitored quarterly. Over utilization could result in desired functions being suspended.

#### **SECTION 5**

- 5.1 <u>Effective Date</u>. Subject to the approval of this Agreement by the governing bodies of both parties, this Agreement takes effect upon the complete execution of this Agreement by the COUNTY and the CITY (the "Effective Date") and shall remain in force for an initial term of one year.
- 5.2 This Agreement shall be renewed automatically from year to year, for up to ten (10) years, unless either the CITY or the COUNTY gives written notice of intent to terminate this Agreement at least ninety (90) days prior to the end of the initial or any subsequent contract year. Such termination notice shall be given as provided in the notice provisions of this Agreement.
- 5.3 <u>Current Revenues</u>. Each party's monetary obligations hereunder are payable only and solely from current revenues appropriated and available for the performance of such obligations. Each party agrees to promptly notify the other party in writing if its governing body fails to appropriate sufficient funds in any fiscal year to perform its obligations under this Agreement. A party's failure to approve sufficient funds shall entitle the other party to terminate this agreement in accordance with Subsections 5.2 and 5.5.

#### 5.4 Force Majeure.

- 5.4.1 In the event that the performance by the CITY or the COUNTY of any of its obligations or undertakings hereunder shall be interrupted or delayed by any occurrence not occasioned by its own conduct, whether such occurrence be an act of God, or the common enemy, or the result of war, riot, civil commotion, sovereign conduct by a jurisdiction other than the CITY or COUNTY, or the act or conduct of any person or persons not a party or privy to this Agreement, then it shall be excused from such performance to the extent, and for such period of time as is reasonably necessary after such occurrence to remedy the effects of such occurrence on the obligation in question.
- 5.4.2 In the event that the performance by the CITY or the COUNTY of any of its obligations or undertakings hereunder shall be interrupted or delayed by an act or omission of an officer, agent, employee, invitee or licensee of the other party, then the CITY or the COUNTY, as the case may be, shall be excused from such performance for such period of time as is reasonably necessary after such occurrence to remedy the effects of such occurrence on the obligation in question.
- 5.4.3 As used in this Subsection 5.4, reference to the "CITY" shall include the CITY, its officers, employees, agents, invitees, and licensees. As used in this Subsection 5.4, reference to the "COUNTY" shall include the COUNTY, its officers, employees,

agents, invitees, and licensees.

#### 5.5 Notice.

5.5.1 Any notice given pursuant to this Agreement by either party to the other shall be in writing and shall be effected by hand-delivery, or by registered or certified mail, postage pre-paid, return receipt required, and delivered or mailed to the proper party at the following address:

#### CITY OF AUSTIN:

Jesus Garza City Manager (or successor)

City of Austin P.O. Box 1088 Austin, Texas 78767

with copy to:

Honorable Andrew F. Martin (or successor)

City Attorney Law Department 114 W 7th Street, 5th Floor

Austin, Texas 78701

COUNTY:

Teresa Reel (or successor)

1101 Nueces

Austin, Texas 78701

with copy to:

Honorable Ken Oden (or successor)

Travis County Attorney

314 W. 11th Street, Suite 300

Austin, Texas 78701

- 5.5.2 Any one of the named individuals receiving notice pursuant to Paragraph 5.5.1 above may change his or her designated address by giving written notice as provided in this Subsection 5.5.
- 5.5.3 Written notice hand-delivered under this Subsection 5.5 will be deemed effective immediately. Written notice sent by registered or certified mail under this Subsection 5.5 will be deemed effective three days after deposit in a U.S. Mail Box or at a U.S. Post Office.
- 5.6 <u>Gender and Number</u>. As used in this Agreement, unless the context indicates otherwise, a masculine, feminine, or neuter gender shall each be deemed to include the other, and the singular or plural number shall each be deemed to include the other.
- 5.7 <u>Entire Agreement</u>. This Interlocal Cooperation Agreement, and where specifically referenced, Exhibit "A" attached hereto, shall constitute the complete and entire agreement between the

- parties hereto respecting the subject matter of this Agreement, and this Agreement supersedes all prior negotiations, agreements, representations, and understandings, either written or oral, if any, between the parties hereto respecting the subject matter of this Agreement.
- Amendment/Modification. This Agreement may not be amended, modified, or changed in any respect whatsoever, except by a further agreement in writing, duly executed by the parties hereto. No official, representative, agent, or employee of Travis COUNTY has any authority to modify this Agreement except pursuant to such express authority as may be granted by the Travis County Commissioners Court.
- 5.9 Other Instruments. The parties hereto covenant and agree that they will execute other and further instruments or any documents as are or may become necessary or convenient to effectuate and carry out the terms of this Agreement.
- 5.10 <u>Severability</u>. If any clause, sentence, provision, paragraph, or article of this Agreement is held by a Court of competent jurisdiction to be invalid, illegal, or unenforceable, such invalidity, illegality, or unenforceability shall not impair or invalidate or nullify the remainder of this Agreement; the effect thereof shall be confined to the clause, sentence, provision, paragraph, or article so held to be invalid, illegal, or unenforceable.
- 5.11 <u>Applicable Law.</u> This Agreement shall be governed and construed in accordance with the laws of the State of Texas; and, venue for any dispute arising out of this Agreement will lie in the appropriate courts of Travis County, Texas.
- 5.12 <u>Breach by CITY</u>. Failure by the CITY to substantially perform its material obligations under this Agreement, and the failure by the CITY to cure such failure within thirty (30) days after receipt of written notice from the COUNTY specifying the alleged failure, shall constitute a breach of this Agreement; and, in the event of such breach, the COUNTY shall be entitled to any and all rights and remedies allowed under Texas Law (statutory law, case law, regulations, or local ordinances) including, but not limited to, the right to terminate this Agreement; provided, however, this subsection is subject to Subsection 5.16 hereof.
- 5.13 Non-Waiver of Breach. In the event the CITY breaches this Agreement, failure by the COUNTY to seek any right or remedy to which it may be entitled or the COUNTY'S partial exercise of a right or remedy to which it may be entitled shall not constitute a waiver of such breach or of any subsequent breach of this Agreement.
- 5.14 Breach by COUNTY. Failure by the COUNTY to substantially perform its material obligations under this Agreement, and the failure by the COUNTY to cure such failure within thirty (30) days after receipt of written notice from the CITY specifying the alleged failure, shall constitute a breach of this Agreement; and, in the event of such breach, the CITY shall be entitled to any and all rights and remedies allowed under Texas law (statutory law, case law, regulations, or local ordinances) including, but not limited to the right to terminate this Agreement; provided, however, this subsection is subject to Subsection 5.16 hereof.

5.15 <u>Non-Waiver of Breach</u>. In the event the COUNTY breaches this Agreement, failure by the CITY to seek any right or remedy to which it may be entitled or the CITY'S partial exercise of a right or remedy to which it may be entitled shall not constitute a waiver of such breach or of any subsequent breach of this Agreement.

## 5.16 No Liability.

- 5.16.1 The performance by the COUNTY of any duties or obligations undertaken by the COUNTY, by and through COUNTY officers (elected or appointed), or any COUNTY departments, agents, employees, invitees, or licensees is expressly conditioned upon the performance by the CITY, its officers, agents, employees, invitees, or licensees of the duties or obligations undertaken by the CITY pursuant to this Agreement. The COUNTY, its officers (elected or appointed), agents, employees, invitees, or licensees shall not be liable and shall not be in breach of this Agreement for failure to perform any duties or obligations undertaken by the COUNTY pursuant to this Agreement where such failure arises directly or indirectly from the CITY'S failure to perform its duties or obligations pursuant to this Agreement.
- 5.16.2 The performance by the CITY of any duties or obligations undertaken by the CITY, by and through any CITY officers (elected or appointed), or any CITY departments, agents, employees, invitees, or licensees is expressly conditioned upon the performance by the COUNTY, its officers, agents, employees, invitees, or licensees of the duties or obligations undertaken by the COUNTY pursuant to this Agreement. The CITY, its officers (elected or appointed), agents, employees, invitees, or licensees shall not be liable and shall not be in breach of this Agreement for failure to perform any duties or obligations undertaken by the CITY pursuant to this Agreement where such failure arises directly or indirectly from the COUNTY'S failure to perform its duties or obligations pursuant to this Agreement.
- 5.16.3 TO THE EXTENT PERMITTED BY THE CONSTITUTION AND LAWS OF THE STATE OF TEXAS, EACH PARTY HERETO AGREES THAT IT SHALL BE RESPONSIBLE FOR ITS OWN PROPORTIONATE SHARE OF ANY LIABILITY FOR LOSS, CLAIM, DAMAGE, AND EXPENSE OF ANY KIND OR NATURE (INCLUDING, BUT NOT LIMITED TO, DAMAGES OR LIABILITY ARISING OUT OF THE DEATH OF OR INJURY TO PERSONS) WHICH MAY ARISE IN CONNECTION WITH ITS ACTS OR OMISSIONS, OR THOSE OF ITS AGENTS, EMPLOYEES, CONTRACTORS, OR ELECTED OR NON-ELECTED OFFICIALS, UNDER THIS AGREEMENT, INCLUDING, BUT NOT LIMITED TO, ANY NEGLIGENCE, RECKLESSNESS OR WILLFUL MISCONDUCT OF ANY PARTY.
- 5.16.4 TO THE EXTENT PERMITTED BY THE CONSTITUTION AND LAWS OF THE STATE OF TEXAS, NEITHER PARTY SHALL EVER BE LIABLE TO THE

OTHER PARTY FOR INCIDENTAL, CONSEQUENTIAL, SPECIAL, OR PUNITIVE DAMAGES ON ANY CLAIM OR CAUSE OF ACTION ARISING UNDER OR CONCERNING THIS AGREEMENT.

#### 5.17 <u>Insurance</u>.

5.17.1 The CITY represents that it is self-insured.

5.17.2 The COUNTY represents that it	is self-insured.	
EXECUTED in duplicate on this the	_day of _August	, 2001.
TRAVIS COUNTY  BY: Semuel T. Biscoe  Honorable Samuel T. Biscoe  Travis County Judge		
DATE: 7-10. 01		
CITY OF AUSTIN  BY: Juni Jany  Jesus Garza, City Manager		

DATE: 8-11-61

(001 1 -11)

800 MHZ TRUNKED VOICE RADIO SYSTEM IMPLEMENTATION INTERLOCAL AGREEMENT

The Parties to this agreement are City of Austin (City), Travis County (County), the Austin Independent School District (AISD), the Capital Metropolitan Transportation Authority (Capital Metro), the University of Texas at Austin (UT), and the Texas Legislative Council and Texas House of Representatives ("Parties"). The purpose of this agreement is to fund the procurement and implementation of the facilities, systems, hardware, software, and engineering services for a regional, unified and integrated 800 MHz Trunked Public Safety and Public Service Voice Radio Communications System ("System") in the Austin-Travis County area, under a contract executed by the City of Austin and Motorola, Inc., referred to as the Communications System Agreement ("CSA"), that is incorporated by reference to this agreement and attached as "Exhibit A".

#### RECITALS

- The Parties to this interlocal agreement ("Agreement") determined that a regional, unified and
  integrated radio communication system in the Austin-Travis County area would improve the ability
  of public safety and public service agencies to communicate and cooperate with each other, and allow
  direct access to and exchange of data, thereby promoting public health, safety, and welfare.
- 2. The Parties agreed to participate in a professional services contract to determine the feasibility of establishing a regional radio communication system to serve the Austin-Travis County area. It was determined that an 800 MHZ trunked voice radio communications system was feasible and appropriate, and a plan of phased implementation for this type of system was developed.
- This Agreement is authorized under the Interlocal Cooperation Act found at Chapter 791 of the Texas Government Code.
- 4. For the purposes of this Agreement and the CSA, "Travis County" or "County" is defined as a political subdivision of the State of Texas, its respective officers and departments, including, but not limited to the officers of the following offices and departments as defined in the Constitution and the laws of the State of Texas: The Travis County Commissioners Court, the Travis County Judge, the Travis County Commissioners, Travis County District Clerk, Travis County Clerk, Travis County District Attorney, Travis County Attorney, Travis County Sheriff, the Travis County District Courts, Travis County Courts (statutory and constitutional), Travis County Probate Court(s), Travis County Justices of the Peace, Travis County Constables, the Travis County Corrections and Supervision Department, Travis County Justice and Public Safety Division, the Travis County Juvenile Court, the Travis County Pretrial Services Department, Travis County Tax Assessor Collector, Travis County Treasurer, Travis County Auditor, Travis County Purchasing Office, Travis County Transportation and Natural Resources Department, and the Travis County Information and Telecommunications Systems Department (ITS).

#### AGREEMENT

#### SYSTEM FUNDING AND PAYMENT.

- (A) The Parties agree that the System equipment will be purchased under the CSA in two identifiable and discrete components: infrastructure equipment and subscriber equipment, and that there will be additional contracts between the City of Austin and third Parties that are necessary for the completion of the project, including project quality assurance, professional engineering, and land purchases for radio tower sites.
- (B) The Parties agree that each party will have an undivided interest in the infrastructure equipment procured under the CSA and capital ownership of real property procured under this project according to the percentages set forth in the table incorporated in this Agreement and attached as "Exhibit B".
- (C) In order to adequately fund and efficiently administer the project, each party agrees that the allocation of implementation costs, and the process that each party shall use to transfer funds to the City of Austin shall be as follows:
  - (1) INVOICES FOR MILESTONE DELIVERABLES AND PROGRESS PAYMENTS.
    - (a) Except as provided below in this paragraph for real property acquisitions, each party agrees to transfer its pro-rata share of funds, up to the maximum individual party's "Total Cost" amount specified in the table in "Exhibit B", necessary to:

      1) purchase the equipment, services, and system under the CSA; as well as 2) funds necessary for additional contracts described Section I.(A) above; to the City of Austin in a manner that is timely within the context of the terms of payment under the CSA. Each party agrees to pay its full pro-rata share of costs for the acquisition of any real property for tower sites to the City of Austin at the time of closing. Each party further agrees that the City of Austin is under no obligation to any party to this Agreement to expend funds under the CSA for items for which it has not timely received all Parties' pro-rata share of the funds for the purchase of the items under an invoice for projected milestone deliverables or progress payments.

However should the City of Austin cease to expend funds under the CSA because of the foregoing sentence, the City of Austin shall immediately give notice to all Parties to this Agreement of such fact and consult with such Parties as to what actions may be undertaken to continue the project without significant delay. Should the funds required for the entire project provided in the "Total Projected Cost" in "Exhibit B" be insufficient to purchase 1) the equipment and services under the CSA as amended; 2) the additional contracts under Section I (A), and 3) the real property for tower sites, then no party shall be obligated to expend any additional funds under the Agreement until the Parties to this

Agreement shall have agreed in writing as to the appropriate actions to be taken, including but not limited to increasing their pro-rata costs, and/or eliminating or decreasing the scope of the services, equipment or real property to be acquired under this Agreement.

- (b) Except as provided in Paragraph 2 below, the Parties agree that the City of Austin shall send an invoice to each party 60 days before the beginning of each calendar quarter. The invoice to each party shall include: (1) that party's pro-rata share of any milestone deliverable payments projected to come due in the calendar quarter, and (2) the party's share of any progress payments that are scheduled for that calendar quarter. A projected cash flow schedule is attached to this Agreement as "Exhibit C". Each party shall submit its respective invoiced amount to the City of Austin not later than the 30th calendar day after the invoice is sent by the City of Austin.
- (c) For any milestone described in "Exhibit C" and for the "Total Projected Cost" of any column depicted in "Exhibit B", if the actual or projected expenditures for such milestone or column ever equals or exceeds one hundred and fifteen percent (115%) of the respective "dollar amount" provided for such milestone in "Exhibit C" or the amount provided in any column in "Exhibit D", respectively, then the City of Austin shall immediately give written notice of such actual or projected cost overrun to the respective governing body of all Parties, and the City of Austin, as managing partner, shall not execute, approve, or otherwise process any change orders with respect to the system, equipment, or services to be provided under this Agreement without first convening a meeting of designated representatives from all of the Parties and securing their written approval of a plan of action to address the actual or projected cost overruns. The City of Austin shall be obligated to observe and follow the instructions in the approved plan of action. All Parties agree, however, that time is of the essence and in order to prevent delays in the Project the Parties agree to make good faith efforts to approve a plan of action within fifteen (15) days after the above-mentioned meeting is convened, unless circumstances beyond the control of any Party prohibits rendering of such approval.

#### (2) INITIAL INVOICE UNDER THE CSA.

Upon the effective date of this Agreement and execution of the CSA by the City of Austin, whichever is later, the City of Austin shall submit an initial invoice to each Party for its respective share of Project Contingency, Implementation Services, and Project Management and Professional Services (including Quality Assurance Services), as described in "Exhibit B", and payments projected to become due in the remainder of the current calendar quarter, if any. Payment for this invoice is due not later than the 30th day after receipt of the City of Austin invoice.

#### (3) CONTINGENCY FUNDS.

The Project Contingency fund described in "Exhibit B", and equal to five percent (5%) of each party's infrastructure costs shall be used only to the extent necessary to complete the System implementation under the CSA. Change orders will be administered and executed in a manner that provides for timely completion of the project and complies with the terms of payment under the CSA. The City of Austin, as the managing partner, shall use a change control process that assesses the cost, schedule, and functionality impacts of each proposed change and shall communicate this information to the Project Team. The Project Team will review the change control process prior to its final adoption.

Each party further agrees that the City of Austin is under no obligation to any party to this Agreement to expend funds under the CSA for items under a change order or ancillary contract if it has not received all Parties' share of the contingency funds prorated to the respective milestone on "Exhibit C". In the event that the Project Contingency fund is exhausted, each party agrees to consider additional funding from its respective governing body or agency.

#### (4) CHANGES TO SCOPE OF CONTRACT.

If a change in the scope of the project is made at the request of and for the benefit of one party of this Agreement, that party will be solely responsible for the costs associated with the requested change of scope, over and above that party's pro-rata share of costs described in Paragraphs I (C)(1-3) of this Agreement, unless the Parties agree otherwise. The City of Austin shall be under no obligation to bear the expense of any change in scope unless it has received the funding for such change order from each party to whom the change in scope is allocated.

- (D) Each party paying for the performance of governmental functions or services under this Agreement must make those payments from current revenues available to the paying party.
- (E) This Agreement does not and is not intended to address ongoing System operations and maintenance after the System implementation and warranty phases of the project. The Parties agree that the purchase of subscriber equipment does not affect the pro-rata distribution of infrastructure costs and ownership, and that each party must purchase its subscriber equipment directly from Motorola, Inc., under the terms of the CSA. The City of Austin, no later than the commencement of the warranty period, with recommendations from the Project Team, will bring forward proposed agreements that address the costs of operations and maintenance of the System, the terms under which the Parties to this Agreement will purchase subscriber equipment, and the terms under which other entities not a party to this Agreement may purchase subscriber equipment.

Unless and until an agreement addressing the respective operations and maintenance costs, as well as any other operations and maintenance obligations, has been approved and executed by all Parties to this Agreement, no party may operate, other than for purposes of testing and/or improving the System, or in any other manner receive a benefit from the operation of the System obtained under the CSA.

(E) Notwithstanding anything to the contrary in this Agreement, the governing body of any party shall provide written notice to the other Parties of this Agreement at least one hundred twenty (120) days prior to the beginning of their next fiscal year indicating the potential to terminate funding for their participation in the project. If the governing body does fail to provide funds necessary to satisfy its respective obligations under this Agreement for such party's following fiscal year during its budget planning and adoption process, such party may terminate their participation in this Agreement with respect to its individual participation and contractual obligations by giving the remaining Parties at least sixty (60) days written notice of termination due to such failure to fund.

In the event one party to this Agreement submits a written notice of termination due to failure to fund or due to nonrenewal of this Agreement under Section IV herein, the remaining Parties to this Agreement shall develop a written agreement to continue with procurement and implementation of the System. None of the remaining Parties shall be obligated to expend any additional funds under this Agreement until the remaining Parties to this Agreement shall have agreed in writing as to the appropriate actions to be taken to continue with procurement and implementation of the System in response to the termination or nonrenewal of a party, including but not limited to increasing their pro-rata costs, and/or eliminating or decreasing the scope of the services, equipment or real property to be acquired under the Agreement. The remaining Parties to this Agreement shall have ninety (90) days from the date written notice of termination or nonrenewal is provided to develop a written agreement with the party that submitted the written notice of termination or nonrenewal to fairly value that party's financial contribution to the project up to the effective date in the written notice of termination or nonrenewal. Should the Parties be unable to reach agreement, an accounting shall be performed using one person to represent the remaining Parties to this Agreement, another person to represent the terminating or nonrenewing party and a third person chosen by the two aforementioned persons. In the event the accounting is performed, it shall be the basis for determining the ownership value of the System for the party submitting the written notice of termination or nonrenewal.

Once the ownership value is determined, the remaining parties to this Agreement will consider ownership options, including but not limited to one of the following:

- find another entity to assume ownership of the determined value;
- divide the value to be assigned proportionally among the remaining parties;
- allow one entity to assume the ownership value; or
- allow the terminating party to retain its ownership value with the stipulation that
  use of the System will not be made available unless and until the party agrees to
  pay its accrued share of the System's operating costs from the effective date of the
  termination.

#### II. THE CITY OF AUSTIN'S PROJECT MANAGEMENT ROLE.

- (A) The Parties agree that the City of Austin shall:
  - (1) After actual delivery to the Parties of the proposed CSA, and/or amendments thereto, and after opportunity for review and comment by the Project Team and the provision of notices as provided in paragraph X, negotiate and execute the CSA and amendments to the CSA on behalf of the Parties to this Agreement;
  - (2) Be responsible for the coordination, supervision and the successful performance and completion of all obligations by Motorola, Inc. under the CSA;
  - (3) Administer the CSA under the Federal and State laws applicable to City of Austin procurements under the City of Austin purchasing policies and as applicable, to the performance of this Interlocal Agreement;
  - (4) After actual delivery to the Parties of all proposed contracts and/or amendments proposed to be executed, and after opportunity for review and comment by the Project Team and the provision of notices as provided in paragraph X, negotiate and execute the contracts necessary to acquire real property interests for sites to be used for infrastructure equipment placement; and
  - (5) After actual delivery to the Parties of all proposed contracts and/or amendments proposed to be executed, and after opportunity for review and comment by the Project Team to this Agreement and the provision of notices as provided in paragraph X, negotiate and execute the contracts, as well as necessary amendments, for auxiliary services necessary for the implementation of the 800 MHz trunked voice radio system.
- (B) The City of Austin, as project manager, will provide monthly written status reports, including current project cost projections, and brief the governing body of each party quarterly as well as upon the request of the governing body of any of the Parties. These status reports shall include current project cost projections individual and specific to each milestone described in "Exhibit C" and for each "Total Projected Cost" of any column depicted in "Exhibit B".
- (C) The City of Austin will perform all of its obligations herein with a reasonable standard of care for the coordination and procurement of such goods and services.
- (D) Notwithstanding anything to the contrary in this Agreement, the City of Austin may not use any funds listed as "Project Contingency" in "Exhibit B" for issues associated with "Implementation Services Costs" under "Exhibit B" without first obtaining the written approval of all the Parties to this Agreement.

#### IV. EFFECTIVE DATE.

This Agreement shall commence and be effective upon the date of approval and execution by the last of all of the Parties to this Agreement, and continue in force and effect for a one (1) year period thereafter. This Agreement shall be renewed automatically for an additional year each year thereafter, except that any party may elect not to renew this Agreement after at least sixty (60) days notice prior to any renewal date to the remaining Parties of its intention not to renew this Agreement.

#### V. ASSIGNMENT.

A party to this Agreement may not assign or transfer its interests under this Agreement without the written approval of all of the remaining Parties.

#### VI. ENTIRETY OF THE AGREEMENT.

This Agreement constitutes the entire Agreement and understanding between the Parties and supercedes all previous agreements, understandings, discussions, or representations concerning its subject matter. This Agreement may not be amended in whole or in part except in a written amendment executed by all Parties to this Agreement. NO OFFICIAL, REPRESENTATIVE, AGENT, OR EMPLOYEE OF TRAVIS COUNTY HAS ANY AUTHORITY TO MODIFY THIS CONTRACT, OR TO WAIVE ANY RIGHT OF THE COUNTY UNDER THIS CONTRACT, EXCEPT PURSUANT TO EXPRESS AUTHORITY TO DO SO GRANTED BY THE COMMISSIONERS COURT OF TRAVIS COUNTY, TEXAS.

#### VII. PERFORMANCE.

The obligations arising under this Agreement shall be performed in Travis County, Texas.

#### VIII. VENUE.

Venue for a dispute arising from this Agreement shall be in Austin, Travis County, Texas.

#### IX. SEVERABILITY.

If a term or provision of this Agreement is determined to be void or unenforceable by a court of competent jurisdiction, the remainder of this Agreement remains effective.

#### X. NOTICE UNDER THE AGREEMENT.

Notice to a party under this Agreement must be in writing, at the respective addresses designated in the list attached as "Exhibit D" to this Agreement. Notice under this Agreement must be delivered in person, or postage prepaid by certified or registered mail, return receipt requested. Notice is effective if delivered in person or three days after deposit in the U. S. Mail, if mailed.

# XI. EXECUTION OF THIS AGREEMENT.

- (A) A party that is a local governmental entity executing this Agreement shall submit certified documentation of approval by the governing body authorized to execute this Agreement.
- (B) A party that is an agency authorized to enter this Agreement under administrative authority shall submit a certified document evidencing the signature of the authorized administrative officer approving this Agreement.

The undersigned officers of Travis County	, [Entity]
[a political subdivision of the State of Texas / a	Texas municipal corporation; etc. ],
and the City of Austin, Texas, a Texas municipal corpora	
hereby certify that The Honorable Samuel T. Biscoe	[Officer],
is the Travis County Judge	[Title] and duly chosen, qualified,
and authorized representative of Travis County	[Entity]
and that Jesus Garza	
is the City Manager	and duly chosen, qualified,
authorized representative of the City of Austin, Texas.	
and that in such capacity have the authority to execute th	is 800 MHz Trunked Voice Radio System
Implementation Interlocal Agreement	as our thris standed to see taken by them
0	
by virtue of official action of the Travis County Commi	ssioner's Court [Title of Governing Body]
of the Travis County [Entity], and the City Council o	f the City of Austin, Texas,
1. No. discussed and accorded the Man official antiquation of the	o annual and hard line of
duly adopted and recorded in the official minutes of the	
the Travis County [Entity], and the City of Au	istin, Texas, in conformity with the laws of
the State of Texas.	

The undersigned officers further certify that all acts, conditions, and things required to exist and to be done precedent to and to render this 800 MHz Trunked Voice Radio System Implementation Interlocal Agreement valid have been properly done and performed and have happened in regular and due time, form, and manner, as required by law; that due provision has been made for the payment of sums due pursuant to this 800 MHz Trunked Voice Radio System Implementation Interlocal Agreement.

The undersigned officers further certify that the representations contained in this Certificate remain true and correct on the date of this Certificate.

	pital Metropolitan Transportation Authority , [Entity]
	the State of Texas / a Texas municipal corporation; etc.],
and the City of Austin, Texas, a T	exas municipal corporation,
hereby certify that Karen Rae	[Officer].
	_[Title] and duly chosen, qualified,
	Capital Metropolitan Transportation Authority [Entity]
and addionized representative or	Capital Metropolitati Transportation Authority [Entity]
and that Jesus Garza	
is the City Manager	and duly chosen, qualified,
authorized representative of the (	
and that in such capacity have the	authority to execute this 800 MHz Trunked Voice Radio System
Implementation Interlocal Agrees	를 가는 성도를 받는 소설을 하는 경우를 하는 것이다. 그는 사람들은 사람들은 사람들은 사람들은 사람들은 사람들은 사람들은 사람들은
by virtue of official action of the	Capital Metropolitan Transportation Authority Board of
	Body] of the Capital Metropolitan Transportation
	nd the City Council of the City of Austin, Texas,
, ,,,	0.3 20.4 20.4 20.4 20.2 20.2 20.4 20.5 20.4 20.4 20.4 20.4
duly adopted and recorded in the	official minutes of the governing bodies of Capital
	hority [Entity], and the City of Austin, Texas, in conformity
with the laws of the State of Texa	
with the laws of the State of Texa	131
The undersioned officers further	certify that all acts, conditions, and things required to exist and to
	ler this 800 MHz Trunked Voice Radio System Implementation
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The undersigned officers further certify that all acts, conditions, and things required to exist and to be done precedent to and to render this 800 MHz Trunked Voice Radio System Implementation Interlocal Agreement valid have been properly done and performed and have happened in regular and due time, form, and manner, as required by law; that due provision has been made for the payment of sums due pursuant to this 800 MHz Trunked Voice Radio System Implementation Interlocal Agreement.

The undersigned officers further certify that the representations contained in this Certificate remain true and correct on the date of this Certificate.

The undersigned officers of Austin Independent School District , [Entity]
[a political subdivision of the State of Texas / a Texas municipal corporation; etc.],
and the City of Austin, Texas, a Texas municipal corporation,
hereby certify that Pascale Forgione [Officer],
is the Superintendent of Schools [Title] and duly chosen, qualified,
and authorized representative of Austin Independent School District _[Entity]
and that Jesus Garza
is the City Manager and duly chosen, qualified,
authorized representative of the City of Austin, Texas.
and that in such capacity have the authority to execute this 800 MHz Trunked Voice Radio System Implementation Interlocal Agreement  by virtue of official action of the Austin Independent School District Board of Directors [Title of Governing Body] of the Austin Independent School District [Entity], and the City Council of the City of Austin, Texas,  duly adopted and recorded in the official minutes of the governing bodies of Austin Independent School District [Entity], and the City of Austin, Texas, in conformity with the laws of the State of Texas.
The undersigned officers further certify that all acts, conditions, and things required to exist and to be done precedent to and to render this 800 MHz Trunked Voice Radio System Implementation Interlocal Agreement valid have been properly done and performed and have happened in regular and due time, form, and manner, as required by law; that due provision has been made for the payment of sums due pursuant to this 800 MHz Trunked Voice Radio System Implementation Interlocal Agreement.
The undersigned officers further certify that the representations contained in this Certificate temain

true and correct on the date of this Certificate.

The undersigned officers of <u>Austin Independent School District</u> , [Entity]
[a political subdivision of the State of Texas / a Texas municipal corporation; etc.],
and the City of Austin, Texas, a Texas municipal corporation,
hereby certify that Pascale Forgione [Officer],
is the Superintendent of Schools [Title] and duly chosen, qualified,
and authorized representative of Austin Independent School District [Entity]
and that Jesus Garza
is the City Manager and duly chosen, qualified,
authorized representative of the City of Austin, Texas.
and that in such capacity have the authority to execute this 800 MHz Trunked Voice Radio System Implementation Interlocal Agreement
by virtue of official action of the Austin Independent School District Board of Directors [Title of Governing Body] of the Austin Independent School District [Entity], and the City Council of the City of Austin, Texas,
duly adopted and recorded in the official minutes of the governing bodies of <u>Austin</u> Independent School District [Entity], and the City of Austin, Texas, in conformity with the laws of the State of Texas.
The undersigned officers further certify that all acts, conditions, and things required to exist and to be done precedent to and to render this 800 MHz Trunked Voice Radio System Implementation Interlocal Agreement valid have been properly done and performed and have happened in regular and due time, form, and manner, as required by law; that due provision has been made for the payment of sums due pursuant to this 800 MHz Trunked Voice Radio System Implementation Interlocal Agreement.
The undersigned officers further certify that the representations contained in this Certificate remain true and correct on the date of this Certificate.

The undersigned officers of The University of Texas	
[a political subdivision of the State of Texas /	a Texas municipal corporation; etc.],
and the City of Austin, Texas, a Texas municipal corp-	
hereby certify that G. Charles Franklin	[Officer],
is the Senior Vice President and Chief Financial Office	er _[Title] and duly chosen, qualified,
and authorized representative of The University o	f Texas At Austin _[Entity]
and that Jesus Garza	
is the City Manager	and duly chosen, qualified,
authorized representative of the City of Austin, Texas	
and that in such capacity have the authority to execute	this 800 MHz Trunked Voice Radio System
Implementation Interlocal Agreement	
by virtue of official action of the The University of	exas at Austin [Entity],
and the City Council of the City of Austin, Texas,	
duly adopted and recorded in the official minutes of the	he governing bodies of The University of
Texas at Austin [Entity], and the City of Austin, Texas at Austin	
of Texas.	

The undersigned officers further certify that all acts, conditions, and things required to exist and to be done precedent to and to render this 800 MHz Trunked Voice Radio System Implementation Interlocal Agreement valid have been properly done and performed and have happened in regular and due time, form, and manner, as required by law; that due provision has been made for the payment of sums due pursuant to this 800 MHz Trunked Voice Radio System Implementation Interlocal Agreement.

The undersigned officers further certify that the representations contained in this Certificate remain true and correct on the date of this Certificate.

	ative Council and House of Representatives, [Entity]
	of Texas / a Texas municipal corporation; etc. ],
and the City of Austin, Texas, a Texas muni	cupal corporation,
hereby certify that Steven Collins	[Officer],
is the Executive Director	[Title] and duly chosen, qualified,
and authorized representative of Texas Le	egislative Council and House of Representatives [Entity]
1d. L. C.	
and that Jesus Garza	and duly chosen, qualified,
is the <u>City Manager</u> authorized representative of the City of Aus	
authorized representative of the City of Au	ini, Texas.
and that in such capacity have the authority Implementation Interlocal Agreement	to execute this 800 MHz Trunked Voice Radio System
Texas Legislative Council and House of	
and the City Council of the City of Austin,	Texas,
	ntity], and the City of Austin, Texas, in conformity with
be done precedent to and to render this 800 Interlocal Agreement valid have been prop- and due time, form, and manner, as require	at all acts, conditions, and things required to exist and to 0 MHz Trunked Voice Radio System Implementation erly done and performed and have happened in regular ed by law; that due provision has been made for the MHz Trunked Voice Radio System Implementation
The undersigned officers further certify that true and correct on the date of this Certific	at the representations contained in this Certificate remain rate.

The undersigned officers ofCity of Austin	, [Entity]
[a political subdivision of the State of Texas	/ a Texas municipal corporation; etc. ],
and the City of Austin, Texas, a Texas municipal cor	poration,
hereby certify that <u>Jesus Garza</u> ,	
is the City Manager	and duly chosen, qualified,
authorized representative of the City of Austin, Texa	is.
and that in such capacity have the authority to execu	te this 800 MHz Trunked Voice Radio System
Implementation Interlocal Agreement	
by virtue of official action of the City Council of A	ustin Title of Governing Bodyl of the City
of Austin [Entity],	
duly adopted and recorded in the official minutes of	the City of Austin, Texas, in conformity with
the laws of the State of Texas.	

The undersigned officers further certify that all acts, conditions, and things required to exist and to be done precedent to and to render this 800 MHz Trunked Voice Radio System Implementation Interlocal Agreement valid have been properly done and performed and have happened in regular and due time, form, and manner, as required by law; that due provision has been made for the payment of sums due pursuant to this 800 MHz Trunked Voice Radio System Implementation Interlocal Agreement.

The undersigned officers further certify that the representations contained in this Certificate remain true and correct on the date of this Certificate.

City of Austin		
Ву:	Austin Independent School District By:	
Jesus Garza	-24	
Typed or Printed Name	Pat Forgione	
	Typed or Printed Name	
City Manager		
Title	Superintendent	
	Title	
Date	Date	
Travis County		
Ву: 0	The University of Texas At Austin	
Samuel T. Biscoe	By:	
Typed or Printed Name	G. Charles Franklin	
-7/2	Typed or Printed Name	
Travis County Judge	Senior Vice President and Chief	
Title	Financial Officer	
1-16.01	Title	
Date	Date	
	Texas Legislative Council and	
Capital Metropolitan Transportation	Texas House of Representatives	
Authority By:	By:	
2).	4	
Karen Rae	Steven Collins	
Typed or Printed Name	Typed or Printed Name	
General Manager	Executive Director	
Title	Title	
Data	Date	

# RADIO COMMUNICATIONS COALITION TRUNKED RADIO SYSTEM RFP

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# CITY OF AUSTIN REQUEST FOR PROPOSAL No. VC98300024 800/900 MHz TRUNKED RADIO SYSTEM FOR AUSTIN/TRAVIS COUNTY & ALLIED JURISDICTIONS

#### 1.0 INTRODUCTION

# 1.1 Purpose

The City of Austin, Texas (hereinafter referred to as the City), acting as the agent for a Coalition of regional governmental entities, seeks proposals in response to this Request for Proposal (RFP) from qualified and experienced radio communication firms to provide, install, customize and support a Regional Trunked Radio System covering the Austin/Travis county metropolitan area as described in this RFP. This system is intended to achieve the following goals:

- Provide guaranteed portable (handheld) radio coverage throughout Travis County and surrounding areas. Requirements for in-building portable radio coverage are detailed in the Coverage section of this RFP.
- Adequate RF channel capacity to support the forecasted Coalition traffic load for at least 10 years from date of system acceptance.
- Wide-area capability, providing seamless coverage for all users.
- Special consideration to be given to electrical grounding and surge suppression to help ensure the system's survivability during adverse weather conditions, when the system is most likely to be heavily used.
- Digital voice encryption capable of providing secure communication, thereby limiting unauthorized access to sensitive or tactical information in both the analog and digital modes
- The new system shall provide total inter-departmental communication capability between all agencies utilizing the new network. It shall also be capable of interoperability with other outside communication systems, both trunked or conventional in nature.
- Expandability the new system must efficiently support the number of units, talkgroups, dispatch positions, and RF channels required by the Radio Communication Coalition.

It is the intent of the Coalition to purchase this System from a single vendor who shall supply and install all of the equipment and provide services related to the installation and optimization of the system, subsystems, and ancillary devices described by this RFP and that there will be a single point of contact responsible to the Coalition that the system and all its component subsystems are working as a whole. Potential vendors should be aware that a single contract with the City shall be awarded for the infrastructure and related systems. Separate contracts with participating governmental entities are anticipated for the purchase of "subscriber" equipment (e.g., mobile/portable radios & dispatcher consoles).

While it anticipated, at this time, that all participating entities will continue their participation in this project, proposer should be aware that any entity or agency may withdraw from the Coalition after proposals are received and evaluated. In addition, other governmental entities, who are not currently a part of the Coalition, may desire to participate in this project and purchase subscriber equipment at a later date, including after final installation.

#### 1.2 Purpose

A Coalition of governmental entities, as shown below, have independently or in groups identified the need to replace and/or upgrade the majority of the existing communications systems and related equipment and facilities as described below. The systems are being replaced or upgraded because of age, location, introduction of better technology, and/or the need for increased capacity as the number of service calls increase. It is important to note that the projects below are not dedicated solely to public safety. Numerous public service agencies will also utilize these systems.

#### 9-1-1 RDMT Project

The overall project, of which this procurement is a part, is known the <u>9-1-1 RDMT</u> <u>Project</u>, and covers the systems shown below:

- The complete upgrade and replacement of the emergency 9-1-1 telephone equipment with end-to-end, digital, computer-based telephone equipment and workstations
- (Installation completed in November 1997))
- The complete upgrade and replacement of existing voice radio communications systems with a single, shared regional "trunked" radio system
- (THIS PROCUREMENT))
- The complete upgrade and replacement of current or acquisition of new Computer Aided Dispatch systems
- (specifications being developed at this time)

- The complete upgrade and replacement of current or acquisition of new Mobile Data Communications system, to include intelligent terminals and Automatic Vehicle Location capabilities
- (specifications being developed at this time)
- The complete upgrade and replacement of existing or acquisition of new Records management systems
- (needs analysis underway by City of Austin, Information Services Department)
- The acquisition and installation of an Integrated Justice System (IJS) for Travis County
- (contract awarded and development/installation underway)
- The complete replacement of the existing analog microwave system with a digital microwave system with expanded capacity
- (Installation completed in December 1997)
- The acquisition and installation of fiber optics networks linking governmental agencies in Austin and Travis County
- (contract awarded and installation in progress)
- A new, regional Geographic Information System with coverage of all of Travis County, the City of Austin, and the urbanized IH 35 development corridor
- (contract awarded and development in progress)
- The complete upgrade and replacement of current traffic signalization systems
- (contract awarded and Phase I near completion)
- The development and installation of an Intelligent System (ITS) by TxDOT and the City of Austin Public Works Department, which includes the integration of freeway and traffic signal management
- (development and installation in progress for some areas)
- The development and installation of an Intelligent Transit System for the Capital Metropolitan Transit Authority
- (design in progress, some installation in progress)
- The development and installation of enhanced emergency management software for the Office of Emergency Operations
- (design and installation in progress)

- The design and construction of one or more multi-agency, multi-jurisdictional communications and/or transportation management facilities to accommodate this additional equipment and newer technology systems
- (Phase I Needs Analysis is underway)

#### 1.3 General

The City of Austin, Travis County, and neighboring municipalities and agencies have joined forces and are working together to develop an improved two-way radio system and infrastructure capable of supporting area-wide communication for all participating agencies. The City of Austin is acting as the primary agent for this coalition of entities, hereinafter referred to as the "Coalition", which includes the entities and agencies listed below. The Radio Communications Coalition consists of the following participants:

#### · City of Austin

- Police Department
- · Fire Department
  - Office of Emergency Management
  - Emergency Operations Center
  - Emergency Conference Network
  - Industry and Broadcast Media
- Emergency Medical Services (and Hospital ER radio communication)
- Austin Energy
  - Utilities Customer Service Office
- Aviation Department
  - Operations
  - Police
- Convention Center
- Fleet Services
- · Health and Human Services

- · Information Systems Office
- Library
- Municipal Court Marshals Unit
- · Parks and Recreation
  - Operations
  - Parks Police
- Public Information Office
- Public Works
  - Transportation Division
  - Construction Inspection Division
  - Street and Bridge Division
- Development Review and Inspection
- Solid Waste Services
- Water and Waste Water
- Drainage Utility
- Radio Communications Division

#### **Travis County**

- Sheriff's Office
  - Operations
  - Law Enforcement

#### Investigative Services

- Constables
  - Constable Precinct #1
  - Constable Precinct #2
  - Constable Precinct #3
  - Constable Precinct #4
  - Constable Precinct #5
- County Attorney's Office
- District Attorney's Office
- Emergency Medical Services

- Department of Emergency Services
- Facilities Management
- Health Services
- Information and Telecommunications Systems
- Juvenile Court
- Medical Examiner
- Transportation and Natural Resources
  - Planning & Engineering
  - Road Maintenance
  - Parks and Natural Resources

#### Other Agencies

- Austin Independent School District
  - Transportation
  - Service Center
  - Police Department
- Austin Community College (PD)
- Capital Area Planning Council
- · Capital Metropolitan Transportation · University of Texas at Austin Authority
- City of Pflugerville
- Texas Department of Transportation -Austin District Office
- Texas House of Representatives
- Texas Legislative Council
- Travis County Firefighters Association

  - West Lake Hills Police Department

The many entities that form the Radio Communication Coalition have recognized that the radio communications systems currently in use by the Public Safety and Public Service agencies have numerous operational and technical problems which decrease the agencies' effectiveness on a day-to-day basis. Further, routine and emergency communication between agencies is currently limited, due to a lack of compatibility between the existing systems. In addition, the existing systems exhibit problems in other areas including:

- overloaded radio channels
- skip and other types of radio interference
- inadequate radio coverage within their service areas
- old and outdated equipment due for replacement
- frequent equipment failures
- insufficient frequencies in existing VHF and UHF bands for expansion
- inadequate dispatch facilities
- inadequate backup capabilities

Accordingly, the Radio Communication Coalition has decided to develop a new area-wide 800/900 MHz trunked radio system capable of supporting the needs of all participating agencies. It is envisioned that the new, shared system will eliminate existing communication problems and will meet both current and long-term needs of the participating agencies (for at least 10 years from initial date of implementation of subscriber equipment).

The system infrastructure, including dispatch console systems, shall be designed such that a single point failure will not disrupt day-to-day or emergency operations in any way. A listing of existing and potential tower sites has been included in this Request for Proposals (RFP) for your consideration. The successful proposer will be ultimately responsible for the radio system's coverage performance. Therefore, the final selection of tower sites to be utilized in the proposed configuration is to be determined by each Proposer. The proposed infrastructure shall be capable of supporting both analog and narrow-band digital radios without requiring the replacement of repeaters.

The various agencies that make up the Radio Communication Coalition currently operate a variety of different types of two-way radio communications systems in the very high frequency (VHF 150 MHz), ultra high frequency (UHF 450 MHz), and 800 MHz frequency bands. Collectively, the agencies intend to operate more than 11,000 two-way radios at the time of subscriber equipment implementation in year 2000. System growth at 5% per year for Public Safety agencies and 3% per year for other agencies for ten years is expected thereafter.

The City of Austin also currently operates a new digital microwave system, and is a partner in the build-out of the Greater Austin Area Telecommunications Network (GAATN) – a fiber optic network running throughout many areas of the City and County. A portion of GAATN is being upgraded to SONET. It is the intent of the Coalition to utilize existing facilities where appropriate to help minimize the development and implementation cost of the new system. Specific information about the microwave network and the GAATN network are provided within this Request for Proposals.

Pricing sheets for the various participating agencies have been included in Section 17. The purpose of individual pricing sheets for participating agencies is to allow them to examine the user equipment cost on an individual basis.

# 1.4 Project Schedule

The implementation of any system of this size and complexity is a significant undertaking. Consideration must be given to the day-to-day operations of City and County agencies, which must not be disturbed or interrupted.

The following is a condensed version of the Proposed Timetable for the project. The successful Proposer must be capable of installing the system and having it fully operational within this time frame:

### 1.4.1 Proposed Timetable

Request for Proposal to Vendors	6/22/98
Pre-Proposer's Conference Questions Due	
Pre-proposer's Conference	
Proposal Due Date	
Proposers' Oral Presentations	
Contract Signed and Executed	3/05/99
Begin training of Technicians Responsible for System Maintenance	6/28/99
Fixed End Equipment Delivered and Fully Operational	
Infrastructure Acceptance Tests Completed	
Infrastructure Test Documentation Submitted & Approved	4/07/00
Coverage Acceptance Tests Completed	4/30/00
Coverage Test Documentation Submitted & Approved	5/28/00
Installation of Initial Subscriber Fleet Begins	5/28/00
Installation of Initial Subscriber Fleet Completed	7/27/00
60-Day Burn-In Test Completed	
Infrastructure Accepted, Warranty Begins	
Installation of Additional Agencies Begins	10/01/00

### 1.5 Proposer Qualifications

Purchase of this system shall be from a single vendor who shall furnish and install all equipment and services related to the installation and optimization of the system, subsystems, and other ancillary devices described by this RFP. This RFP seeks assurance of the following:

- Timely implementation
- A fault tolerant <u>turnkey</u> system
- Guaranteed radio coverage for the described service area
- Equipment performance
- Operator/user friendliness
- Maintainability
- Reliability
- Long-term useful life
- · Quality training for users and technicians
- Quality Service & Maintenance

The successful Proposer must have demonstrated successful performance on installations of a similar nature and scope to that requested by this RFP. Specifically, Proposers must have developed and implemented a minimum of five large-scale, multi-agency or multi-jurisdictional Public Safety trunked radio systems of similar scope within the past five years.

# 1.6 Compliance with Federal, State, County and Local Laws; City Standard Terms & Conditions, and Highest Standards of Manufacturing & Engineering Practice

Proposals must comply with all federal, state, county, municipal and local laws concerning this type of system/equipment/service. Design, strength, quality of materials and workmanship must conform to the highest standards of manufacturing and engineering practice. All items used must be new and unused in first class condition, of current manufacture and be of the type generally accepted for the proposed use.

Proposers must address the system approach contained herein. However, proposers are encouraged to submit alternate proposals as a supplement, if those alternative proposals may be of benefit to the City and the Radio Communications Coalition. Alternate proposals involving previously utilized equipment, such as hurricane relief operations, Mid-East military maneuvers, Papal visits and past Olympic events fall under the above category. Such alternate offerings must be clearly identified as alternate proposals. The City reserves the right to accept or reject any and/or all proposals as it shall deem to be in the best interests of the City.

Where the Proposer does not agree with the City's standard terms & conditions, we require the proposal to enumerate the specific clauses that the Proposer wishes to amend or delete and suggest alternative wording. In view of the length of time involved in obtaining the approval of legal counsel, we do not encourage proposals which simply state that the Offeror's proposal is subject to the Offeror's standard terms & conditions, or that the terms & conditions are subject to negotiation after award.

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#### 2.0 RESPONSE PROCEDURES

#### 2.1 Standard Purchase Definitions

#### 2.1.1 Definitions

- a. Addendum means a written instrument issued by the Contract Awarding Authority that modifies or clarifies the Solicitation prior to the Due Date. "Addenda" is the plural form of the word.
- b. Appropriate, Appropriated, or Appropriation means the adoption by the City Council of the City of a budget for a fiscal year that includes payments to be made under the Contract during the respective fiscal year.
- Authorized City Representative means a person designated by the City Manager to act for the Contract Awarding Authority.
- d. Best Proposal means the best evaluated Proposal in response to an RFP.
- e. Best Proposer means the Vendor submitting the Best Proposal.
- Authority and on the behalf of any other entities used by the participating agencies in the Radio Communications Coalition, pursuant to Section 791.013 of the Texas Government Code, to procure goods and services under the overall framework of any contract(s) they may be signed pursuant to this RFP. Consequently, wherever indemnification, warranty, confidentiality, and other clauses refer to the "Buyer", they shall include not only the City of Austin, but also all the other participating agencies and entities in the Radio Communications Coalition; and the Confidential Information of the Buyer shall include the Confidential Information of all of the participating agencies and entities in the Radio Communications Coalition.
- g. City means the City of Austin, a Texas home-rule municipal corporation.
- h. Contract means the binding legal agreement between the Buyer and the Seller. The City of Austin Contract Awarding Authority will negotiate and sign any contract that may result from this RFP, on behalf of the City, County, and other participating agencies in the Radio Communications

Coalition for the infrastructure, including Radio Towers, Radio Communications Center, and other equipment of a common nature.

The City of Austin Contract Awarding Authority will negotiate and sign any contract that may result from this RFP, on behalf of the City, County, and other participating agencies and entities in the Radio Communications Coalition for the subscriber equipment, but each agency will issue separate Purchase Orders for the subscriber equipment required by them. No deliveries will be made by the Seller under such a contract, until an order is placed by each Agency or Entity by the issue of such a Purchase Order

The Contract includes, without limitation, the Solicitation, the Offer submitted in response to the Solicitation, the Contract award, the Standard Purchase Terms and Conditions, Supplemental Terms and Conditions if any, Specifications, and any addenda and amendments thereto. Any inconsistency or conflict in the Contract documents shall be resolved by giving precedence in the following order:

- i. any exceptions to the Offer accepted in writing by the Buyer
- ii the Supplemental Purchase Terms and Conditions
- iii. these Standard Purchase Terms and Conditions
- iv. the Offer, exhibits, and attachments; within the Offer, drawings (figured dimensions shall govern over scaled dimensions) will take precedence over specifications or scope of work.
- Contract Awarding Authority means a City department authorized to enter into Contracts on behalf of the City.
- j Default. Seller shall be in default under the Contract if Seller (a) fails to fully, timely and faithfully perform any of its material obligations under the Contract, (b) fails to provide adequate assurance of performance when requested, or (c) becomes insolvent or seeks relief under the bankruptcy laws of the United States.
  - Deliverables means the goods, products, materials, and/or services to be provided to Buyer by Seller.
  - Disadvantaged Business Enterprise is defined in 49 CFR 23.62 or other applicable federal regulations.
  - m. Due Date means the date and time specified for receipt of Proposals.

- n. Goods are supplies, materials, or equipment.
- Minority-Owned Business is defined in chapter 5-7, 1992 City Code.
- p. Non-Professional Services are services performed that are not of a professional nature such as lawn care, security, janitorial, etc.
- q. Offer means a complete signed response submitted to Buyer in response to a Solicitation including, but not limited to, a bid submitted in response to an Invitation for Bid, a proposal submitted in response to a Request for Proposal, a quote submitted in response to a Request for Quotation, or a statement of qualifications and interest submitted in response to a Request for Qualifications.
- r. Radio Communications Coalition includes the City of Austin, Travis County and the other governmental Entities and Agencies listed in Section 1.3
- s. Pre-Proposal Conference means a conference conducted by the Purchasing Office, held in order to allow Vendors to ask questions about the proposed Contract and particularly the Contract specifications.
- Professional Services mean services that use skills that are predominantly mental or intellectual, rather than physical or manual in the context of City and County exemptions for contracts for personal and professional services. (See Section 252.022 and Section 262.024 of the State of Texas, Local Government Code) Professional Services also means those services within the scope of the practice of accounting, architecture, optometry, medicine, land surveying, or professional engineering in the context of the Professional Services Act, Article 664.1-3 of the State of Texas Government Code, Section 2254.
- Proposal is a complete, properly signed response to a Solicitation that, if accepted, would bind the Vendor to perform the resultant Contract.
- Proposals are written responses to a Request for Proposal.
- w. Purchase Order is an order placed by the Purchasing Office for the purchase of Goods or Services written on the City's standard Purchase Order form and which, when accepted by the Vendor, becomes a contract. Purchase Orders may also be issued by the various participating agencies, other than the City of Austin, for good and services required by such

participating agencies, in which case, such purchase order is the Vendor's authority to deliver and invoice that agency for the goods or services specified and the agency's commitment to accept the goods or service for an agreed upon price. Proposers should be aware that such transactions are subject to the terms and conditions of each agency. These terms and conditions will be made available to the successful proposer at the stage of contract negotiation. The City will not be responsible for the commitments made by such agencies and resolution of any disputes with such agencies must be pursued with such agencies under the overall framework of any contract that may be signed pursuant to the RFP. The Purchase Order is the Vendor's authority to deliver and invoice the City for Goods or Services specified, and the City's commitment to accept the Goods or Services for an agreed upon price.

- x. Purchasing Office refers to the Purchasing Office in the Financial and Administrative Services Department for the City of Austin.
- y Request for Proposal (RFP) refers to a document requesting an offer be made by a Vendor in accordance with Tex. Loc. Government Code Ann, section 252.042, such offers may be subject to negotiation. Negotiations may be made after award, but before signing of the contract.
- z. Seller means the person, firm or entity selling goods and services to the Buyer under a Contract.
- aa. Services include all work or labor performed for the City on an independent contractor basis other than construction.
- bb. Solicitation means, as applicable, an Invitation for Bid, Request for Proposal, Request for Qualifications or a Request for Quotation.
- cc. Subcontractor means a person, firm or entity providing goods and services to Seller to be used in the performance of Seller's obligations under the Contract.
- dd. Vendor is a person or business that submits a Bid/Proposal in response to a Solicitation. Any Vendor may be represented by an agent after submitting evidence demonstrating the agent's authority The agent cannot certify as to his own agency status.
- ee. Woman-Owned Business is defined in chapter 5-7, 1992 City Code.

#### 2.1.2 UCC Definition

Whenever a term defined by the Uniform Commercial Code, as enacted by the State of Texas, is used in the contract, the UCC definition shall control, unless otherwise defined in the contract.

### 2.2 Solicitation Instructions (RFP)

#### 2.2.1 Source Guide

All Vendors desiring to sell to the City of Austin are required to obtain a current copy of the City of Austin Source Guide. The Source Guide contains additional information on how to prepare Proposals and how to contract for City business. A copy of the source guide is available, upon request, in the Purchasing Office.

#### 2.2.2 Solicitation

- a. Review of Documents: Vendors are expected to examine all documents that make up the Solicitation. Vendors shall promptly notify the City of any omission, ambiguity, inconsistency or error that they may discover upon examination of the Solicitation. Vendors must use a complete Solicitation to prepare Proposals. The City assumes no responsibility for any errors or misrepresentations that result from the use of incomplete Solicitations.
- b. Location of Documents: Solicitations are issued by the Contract Awarding Authority. The location and phone number for the Contracting Awarding Authority are specified in the advertisement and in the Solicitation.

### 2.2.3 Opportunity to Protest

The Purchasing Officer has the authority to settle or resolve any claim of an alleged deficiency or protest. The procedures for notifying the City of Austin of an alleged deficiency or filing a protest are listed below. If you fail to comply with any of these requirements, the Purchasing Officer may dismiss your complaint or protest.

a. Prior to proposal closing date: If you are a prospective Proposer and you become aware of the facts regarding what you believe is a deficiency in the solicitation process before the closing date for receipt of proposals, you must notify the City in writing of the alleged deficiency before that date. giving the City an opportunity to resolve the situation prior to the Proposal closing date.

- b. After proposal closing date: If you submit a Proposal to the City and you believe that there has been a deficiency in the solicitation process or the award, you have the opportunity to protest the solicitation process or the recommended award as follows:
  - i. You must file written notice of your intent to protest within three (3) calendar days of the date that you know or should have known of the facts relating to the protest. If you do not file a written notice of intent within this time, you have waived all rights to protest the solicitation process or the award.
  - ii. You must file your written protest within fourteen (14) calendar days of the date that you know or should have known of the facts relating to the protest unless you know of the facts before the Proposal has been closed. If you know of the facts before those dates, you must notify the City as stated above.
  - iii. You must submit your protest in writing and must include the following information:
    - (1) your name, address, telephone, and fax number;
    - (2) the solicitation number and the CIP number, if applicable;
    - (3) a detailed statement of the factual grounds for the protest, including copies of any relevant documents.
  - iv. Your protest must be concise and presented logically and factually to help with the City's review.
  - v. When the City receives a timely written protest, the Purchasing Officer will determine whether the grounds for your protest are sufficient. If the Purchasing Officer decides that the grounds are sufficient, the Purchasing Office will schedule a protest hearing, usually within five (5) working days. If the Purchasing Officer determines that your grounds are insufficient, the City will notify you of that decision in writing.
  - vi. The protest hearing is informal and is not subject to the Open Meetings Act. The purpose of the hearing is to give you a chance to present your case, it is not an adversarial proceeding. Those who may attend from the City are: representatives from the department that requested the purchase, the Department of Law, the Purchasing Office, and other appropriate City staff. You may

bring a representative or anyone else that will present information to support the factual grounds for your protest with you to the hearing.

- vii. A decision will usually be made within fifteen (15) calendar days after the hearing.
- viii. The City will send you a copy of the hearing decision after the appropriate City staff has reviewed the decision.
- ix. When a protest is filed, the City usually will not make an award until a decision on the protest is made. However, the City will not delay an award if the City Manager or the Purchasing Officer determines that:
  - the City urgently requires the supplies or services to be purchased, or
  - (2) failure to make an award promptly will unduly delay delivery or performance.

In those instances, the City will notify you and make every effort to resolve your protest before the award.

### 2.3 Standard Purchasing Terms & Conditions (RFP)

By submitting an Offer in response to a Solicitation, Seller agrees that the Contract shall be governed by the following terms and conditions. Unless otherwise specified in the Contract, Subsections 2.3.3, 2.3.4, 2.3.5, 2.3.6, 2.3.7, 2.3.8, 2.3.20, 2.3.21, and 2.3.36 shall apply only to a Solicitation to purchase goods, and Subsections 2.3.9, 2.3.10, 2.3.11 and 2.3.22 shall apply only to a Solicitation to purchase services to be performed principally at Buyer's premises or on public rights-of-way.

### 2.3.1 Seller's Obligations

Seller shall fully and timely provide all deliverables described in the Solicitation and in Seller's Offer in strict accordance with the terms, covenants, and conditions of the Contract and all applicable Federal, State, and local laws, rules, and regulations.

#### 2.3.2 Effective Date/Term

Unless otherwise specified in the Solicitation, this Contract shall be effective as of the date the contract is signed by Buyer, and shall continue in effect until all obligations are performed in accordance with the Contract.

### 2.3.3 Seller to Package Deliverables

Seller will package deliverables in accordance with good commercial practice. Unless otherwise provided in the Specifications or Supplemental Terms and Conditions, each shipping container shall be clearly and permanently marked as follows: (a) Seller's name and address, (b) Buyer's name, address and purchase order or purchase release number and the price agreement number if applicable, (c) Container number and total number of containers, e.g. box 1 of 4 boxes, and (d) the number of the container bearing the packing slip. Seller shall bear cost of packaging. Deliverables shall be suitably packed to secure lowest transportation costs and to conform with requirements of common carriers and any applicable specifications. Buyer's count or weight shall be final and conclusive on shipments not accompanied by packing lists.

### 2.3.4 Shipment Under Reservation Prohibited

Seller is not authorized to ship the deliverables under reservation and no tender of a bill of lading will operate as a tender of deliverables.

#### 2.3.5 Title & Risk of Loss

Title to and risk of loss of the deliverables shall pass to Buyer only when Buyer actually receives and accepts the deliverables.

### 2.3.6 Delivery Terms & Transportation Charges

Deliverables shall be shipped F.O.B. point of delivery unless otherwise specified in the Supplemental Terms and Conditions. Unless otherwise stated in the Offer, Seller's price shall be deemed to include all delivery and transportation charges. Buyer shall have the right to designate what method of transportation shall be used to ship the deliverables. The place of delivery shall be that set forth in the block of the purchase order or purchase release entitled "Receiving Agency".

### 2.3.7 Right of Inspection and Rejection

Buyer expressly reserves all rights under law, including, but not limited to the Uniform Commercial Code, to inspect the deliverables at delivery before accepting

them, and to reject defective or non-conforming deliverables. If Buyer has the right to inspect Seller's, or Seller's Subcontractor's, facilities, or the deliverables at Seller's, or Seller's Subcontractor's, premises, Seller shall furnish, or cause to be furnished, without additional charge, all reasonable facilities and assistance to Buyer to facilitate such inspection.

### 2.3.8 No Replacement of Defective Tender

Every tender or delivery of deliverables must fully comply with all provisions of the Contract as to time of delivery, quality, and quantity. Any non-complying tender shall constitute a breach and Seller shall not have the right to substitute a conforming tender; provided, where the time for performance has not yet expired, the Seller may notify Buyer of the intention to cure and may then make a conforming tender within the time allotted in the contract.

#### 2.3.9 Place & Condition of Work

Buyer shall provide Seller access to the sites where Seller is to perform the services as required in order for Seller to perform the services in a timely and efficient manner. Seller acknowledges that it has satisfied itself as to the nature of Buyer's service requirements and specifications, the location and essential characteristics of the work sites, the quality and quantity of materials, equipment, labor and facilities necessary to perform the services, and any other condition or state of fact which could in any way affect performance of Seller's obligations under the contract. Seller hereby releases and holds Buyer harmless from and against any liability or claim for damages of any kind or nature if the actual site or service conditions differ from expected conditions.

#### 2.3.10 Workforce

- a. Seller shall employ only orderly and competent workers, skilled in the performance of the services that they will perform under the Contract.
- b. Seller, its employees, subcontractors, and subcontractor's employees may not use or possess any firearms, alcoholic or other intoxicating beverages, illegal drugs or controlled substances while on the job or on Buyer's property, nor may such workers be intoxicated, or under the influence of alcohol or drugs, on the job.
- c. If Buyer or Buyer's representative notifies Seller that any worker is incompetent, disorderly or disobedient, has knowingly or repeatedly violated safety regulations, has possessed any firearms, or has possessed or was under the influence of alcohol or drugs on the job, Seller shall immediately remove such worker from Contract services, and may not

employ such worker again on Contract services without Buyer's prior written consent.

### 2.3.11 Compliance with Safety Regulations

Seller, its Subcontractors, and their respective employees, shall comply fully with all applicable federal, state, and local safety and health laws, ordinances, rules and regulations in the performance of the services, including but not limited to those promulgated by Buyer and by the Occupational Safety and Health Administration (OSHA). In case of conflict, the most stringent safety requirement shall govern. Seller shall indemnify and hold Buyer harmless from and against all claims, demands, suits, actions, judgments, fines, penalties and liability of every kind arising from the breach of Seller's obligations under this paragraph

#### 2.3.12 Invoices

- Seller shall submit separate invoices in duplicate on each purchase order or purchase release after each delivery. If partial shipments or deliveries are authorized by the City, a separate invoice must be sent for each shipment or delivery made.
- b. Invoices shall indicate the purchase order or purchase release number and the supply agreement number if applicable. Invoices shall be itemized and transportation charges, if any, shall be listed separately. A copy of the bill of lading and the freight waybill, when applicable, shall be attached to the invoice. Invoices shall be mailed to the City of Austin at P.O. Box 1088, Austin, Texas 78767. Any invoices sent to the City's Electric Utility Department shall be mailed to P.O. Box 3546, Austin, Texas 78764-3546. Unless otherwise instructed in writing, Buyer may rely on the remittance address specified on Seller's invoice.
- c. Invoices for labor shall include a copy of all time sheets with trade labor rate and deliverables order number clearly identified. Invoices shall also include a tabulation of work-hours at the appropriate rates and grouped by work order number. Time billed for labor shall be limited to hours actually worked at the work site.
- d. Unless otherwise expressly authorized in the Contract, Seller shall pass through all Subcontract and other authorized expenses at actual cost without markup.
- e. Federal excise taxes, State taxes, or City sales taxes must not be included in the invoiced amount. Buyer will furnish a tax exemption certificate upon request.

### 2.3.13 Payment

- a. All proper invoices received by Buyer will be paid within 30 days of the Buyer's receipt of the deliverables or of the invoice, whichever is later. If payment is not timely made, interest shall accrue on the unpaid balance at the lesser of one percent per month or the maximum lawful rate; except, if payment is not timely made for a reason for which Buyer may withhold payment hereunder, interest shall not accrue until ten days after the grounds for withholding payment have been resolved.
- b. If partial shipments or deliveries are authorized by the City, the seller will be paid for the partial shipment or delivery, as stated above, provided that the invoice matches the shipment or delivery.
- c. Buyer may withhold or set off the entire payment or part of any payment otherwise due Seller to such extent as may be necessary on account of:
  - delivery of defective or non-conforming deliverables by Seller,
  - third party claims, which are not covered by the insurance which Seller is required to provide, are filed or reasonable evidence indicating probable filing of such claims;
  - iii. failure of Seller to pay Subcontractors, or for labor, materials or equipment;
  - iv. damage to the property of Buyer or Buyer's agents, employees or contractors, which is not covered by insurance required to be provided by Seller;
  - v. reasonable evidence that Seller's obligations will not be completed within the time specified in the Contract, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay;
  - vi. failure of Seller to submit proper invoices with all required attachments and supporting documentation; or
  - vii. failure of Seller to comply with any material provision of the Contract Documents.
- d. Notice is hereby given of Article VIII, Section 1 of the Austin City Charter which prohibits the payment of any money to any person, firm or corporation who is in arrears to the City for taxes, and of §5-1-2 of the

Austin City Code of 1992, as amended, concerning the right of the City to offset indebtedness owed the City.

e. Buyer's payment obligations are payable only and solely from funds Appropriated and available for the purpose of this purchase. The absence of Appropriated or other lawfully available funds shall render the Contract null and void to the extent funds are not Appropriated or available and any deliverables delivered but unpaid shall be returned to Seller. Buyer shall provide Seller written notice of the failure of the City to make an adequate Appropriation for any fiscal year to pay the amounts due under the Contract, or the reduction of any Appropriation to an amount insufficient to permit the Buyer to pay its obligations under the Contract.

### 2.3.14 Travel Expenses

All travel and lodging expenses in connection with the Contract for which reimbursement may be claimed by Seller under the terms of the Solicitation will be reviewed against the Current Runzheimer Meal-Lodging Index (the "Index"). No amounts in excess of the Index shall be paid. All invoices must be accompanied by copies of receipts (e.g. hotel bills, airline tickets). No reimbursement will be made for expenses not actually incurred. Airline fares in excess of coach or economy will not be reimbursed. Mileage charges may not exceed the amount permitted as a deduction in any year under the Internal Revenue Code or Regulations.

#### 2.3.15 Final Close-Out

- a. If an MBE/WBE Program Compliance Plan is required by the Solicitation and Seller has identified Subcontractors, Seller is required to submit a Contract Close-Out MBE/WBE Compliance Report to the project manager or contract manager no later than the 15th calendar day after completion of all work under the contract. Final payment, retainage, or both may be withheld if Seller is not in compliance with the requirements of the Compliance Plan as accepted by Buyer.
- b. The making and acceptance of final payment will constitute:
  - i. a waiver of all claims by Buyer against Seller, except claims (1) which have been previously asserted in writing and not yet settled, (2) arising from defective work appearing after final inspection, (3) arising from failure of Seller to comply with the Contract or the terms of any warranty specified herein, (4) arising from Seller's continuing obligations under the Contract, including but not limited to indemnity and warranty obligations, or (5) arising under Buyer's right to audit; and

 a waiver of all claims by Seller against Buyer other than those previously asserted in writing and not yet settled.

### 2.3.16 Special Tools & Test Equipment

If the price stated on the Offer includes the cost of any special tooling or special test equipment fabricated or required by Seller for the purpose of filling this order, such special tooling equipment and any process sheets related thereto shall become the property of Buyer and shall be identified by the Seller as such.

### 2.3.17 Right to Audit

- a. Seller agrees that the representatives of the Office of the City Auditor or other authorized representatives of Buyer shall have access to, and the right to audit, examine, or reproduce, any and all records of Seller related to the performance under this Contract. Seller shall retain all such records for a period of three (3) years after final payment on this Contract or until all audit and litigation matters that Buyer has brought to the attention of Seller are resolved, whichever is longer. Seller agrees to refund to Buyer any overpayments disclosed by any such audit.
- Seller shall include section a. above in all subcontractor agreements entered into in connection with this Contract.

#### 2.3.18 Subcontractors

- a. If an MBE/WBE Program Compliance Plan is required by the Solicitation and Seller has identified Subcontractors, Seller shall comply with the provisions of Chapter 5-7 of the Austin City Code of 1992, as amended, and the terms of the Compliance Plan as approved by the City (the "Plan"). Seller shall not initially employ any Subcontractor except as provided in Seller's Plan. Seller shall not substitute any Subcontractor identified in the Plan, unless the substitute has been accepted by Buyer in writing in accordance with the provisions of Chapter 5-7. No acceptance by Buyer of any Subcontractor shall constitute a waiver of any rights or remedies of Buyer with respect to defective deliverables provided by a Subcontractor. If a Plan has been approved, Seller is additionally required to submit monthly Subcontract Awards and Expenditures Report to the project manager or contract manager no later than the tenth calendar day of each month.
- Work performed for Seller by a Subcontractor shall be pursuant to a written contract between Seller and Subcontractor. The terms of the

subcontract may not conflict with the terms of the Contract, and shall contain provisions that:

- require that all deliverables to be provided by the Subcontractor be provided in strict accordance with the provisions, specifications and terms of the Contract;
- ii prohibit the Subcontractor from further subcontracting any portion of the Contract without the prior written consent of Buyer and Seller. Buyer may require, as a condition to such further subcontracting, that the Subcontractor post a payment bond in form, substance and amount acceptable to Buyer;
- require Subcontractors to submit all invoices and applications for payments, including any claims for additional payments, damages or otherwise, to Seller in sufficient time to enable Seller to include same with its invoice or application for payment to Buyer in accordance with the terms of the Contract;
- require that all Subcontractors obtain and maintain, throughout the term of their contract, insurance in the type and amounts specified for Seller, with Buyer being a named insured as its interest shall appear; and
- v. require that the Subcontractor indemnify and hold Buyer harmless to the same extent as Seller is required to indemnify Buyer.
- c. Seller shall be fully responsible to Buyer for all acts and omissions of the Subcontractors just as Seller is responsible for Seller's own acts and omissions. Nothing in the Contract shall create for the benefit of any such Subcontractor any contractual relationship between Buyer and any such Subcontractor, nor shall it create any obligation on the part of Buyer to pay or to see to the payment of any moneys due any such Subcontractor except as may otherwise be required by law.
- d. Seller shall pay each Subcontractor its appropriate share of payments made to Seller not later than ten days after receipt of payment from Buyer.

### 2.3.19 Warranty-Price

a. Seller warrants the prices quoted in the Offer are no higher than Seller's current prices on orders by others for like deliverables under similar terms of purchase.

- b. Seller certifies that the prices in the Offer have been arrived at independently without consultation, communication, or agreement for the purpose of restricting competition, as to any matter relating to such fees with any other firm or with any competitor.
- c. In addition to any other remedy available, Buyer may deduct from any amounts owed to Seller, or otherwise recover, any amounts paid for items in excess of Seller's current prices on orders by others for like deliverables under similar terms of purchase.

### 2.3.20 Warranty-Title

Seller warrants that it has good and indefeasible title to all deliverables furnished under the Contract, and that the deliverables are free and clear of all liens, claims, security interests and encumbrances. Seller shall indemnify and hold Buyer harmless from and against all adverse title claims to the deliverables.

### 2.3.21 Warranty-Deliverables

Seller warrants and represents that all deliverables sold Buyer under the Contract shall be free from defects in design, workmanship or manufacture, and conform in all material respects to the specifications, drawings, and descriptions in the Solicitation, to any samples furnished by Seller, to the terms, covenants and conditions of the Contract, and to all applicable State, Federal or local laws, rules, and regulations, and industry codes and standards. Unless otherwise stated in the Solicitation, the deliverables shall be new or recycled merchandise, and not used or reconditioned.

- Recycled deliverables shall be clearly identified as such.
- Seller may not limit, exclude or disclaim the foregoing warranty or any warranty implied by law; and any attempt to do so shall be without force or effect.
- c. Unless otherwise specified in the Contract, the warranty period shall be at least one year from the date of acceptance of the deliverables or from the date of acceptance of any replacement deliverables. If during the warranty period, one or more of the above warranties are breached, Seller shall promptly upon receipt of demand either repair the non-conforming deliverables, or replace the non-conforming deliverables with fully conforming deliverables, at Buyer's option and at no additional cost to Buyer. All costs incidental to such repair or replacement, including but not limited to, any packaging and shipping costs, shall be borne exclusively by Seller. Buyer shall endeavor to give Seller written notice of the breach of

warranty within thirty (30) days of discovery of the breach of warranty, but failure to give timely notice shall not impair Buyer's rights under this section.

- d. If Seller is unable or unwilling to repair or replace defective or nonconforming deliverables as required by Buyer, then in addition to any other available remedy, Buyer may reduce the quantity of deliverables it may be required to purchase under the Contract from Seller, and purchase conforming deliverables from other sources. In such event, Seller shall pay to Buyer upon demand the increased cost, if any, incurred by Buyer to procure such deliverables from another source.
- e. If Seller is not the manufacturer, and the deliverables are covered by a separate manufacturer's warranty, Seller shall transfer and assign such manufacturer's warranty to Buyer. If for any reason the manufacturer's warranty cannot be fully transferred to Buyer, Seller shall assist and cooperate with Buyer to the fullest extent to enforce such manufacturer's warranty for the benefit of Buyer.
- f. Seller further represents and warrants to Buyer that the occurrence in or use by the deliverables containing computer code of dates on or after January 1, 2000 ("Millennial Dates"), will not adversely affect the performance of such deliverables with respect to date-dependent data, computations, output, or other functions (including, without limitation, calculating, comparing, and sequencing) and that such deliverables will create, store, process, and output information related to or including Millennial Dates without error or omissions and at no additional cost to Buyer. At Buyer's request, Seller will provide evidence sufficient to demonstrate such deliverables meet the foregoing.

### 2.3.22 Warranty-Services

Seller warrants and represents that all services to be provided Buyer under the Contract will be fully and timely performed in a good and workmanlike manner in accordance with generally accepted industry standards and practices, the terms, conditions, and covenants of the Contract, and all applicable Federal, State and local laws, rules or regulations.

- Seller may not limit, exclude or disclaim the foregoing warranty or any warranty implied by law, and any attempt to do so shall be without force or effect.
- b. Unless otherwise specified in the Contract, the warranty period shall be at least one year from acceptance of the services. If during the warranty

period, one or more of the above warranties are breached, Seller shall promptly upon receipt of demand perform the services again in accordance with above standard at no additional cost to Buyer. All costs incidental to such additional performance shall be borne by Seller. Buyer shall endeavor to give Seller written notice of the breach of warranty within thirty (30) days of discovery of the breach warranty, but failure to give timely notice shall not impair Buyer's rights under this section.

c. If Seller is unable or unwilling to perform its services in accordance with the above standard as required by Buyer, then in addition to any other available remedy, Buyer may reduce the amount of services it may be required to purchase under the Contract from Seller, and purchase conforming services from other sources. In such event, Seller shall pay to Buyer upon demand the increased cost, if any, incurred by Buyer to procure such services from another source.

### 2.3.23 Acceptance of Incomplete or Non-Conforming Deliverables

If, instead of requiring immediate correction or removal and replacement of defective or non-conforming deliverables, Buyer prefers to accept it, Buyer may do so. Seller shall pay all claims, costs, losses and damages attributable to Buyer's evaluation of and determination to accept such defective or non-conforming deliverables. If any such acceptance occurs prior to final payment, Buyer may deduct such amounts as are necessary to compensate Buyer for the diminished value of the defective or non-conforming deliverables. If the acceptance occurs after final payment, such amount will be refunded to Buyer by Seller.

### 2.3.24 Right to Assurance

Whenever one party to the Contract in good faith has reason to question the other party's intent to perform, demand may be made to the other party for written assurance of the intent to perform. In the event that no assurance is given within the time specified after demand is made, the demanding party may treat this failure as an anticipatory repudiation of the Contract.

### 2.3.25 Stop Work Notice

Buyer may issue an immediate Stop Work Notice in the event Seller is observed performing in a manner that is in violation of Federal, State, or local guidelines, or in a manner that is determined by Buyer to be unsafe to either life or property. Upon notification, Seller will cease all work until notified by Buyer that the violation or unsafe condition has been corrected. Seller shall be liable for all costs incurred by Buyer as a result of the issuance of such Stop Work Notice.

#### 2.3.26 Default

Seller shall be in default under the Contract if Seller (a) fails to fully, timely and faithfully perform any of its material obligations under the Contract, (b) fails to provide adequate assurance of performance under Paragraph 24, or (c) becomes insolvent or seeks relief under the bankruptcy laws of the United States.

#### 2.3.27 Termination for Cause

In the event of a default by Seller, Buyer shall have the right to terminate the Contract for cause, by written notice effective ten (10) days, unless otherwise specified, after the date of such notice, unless Seller, within such ten (10) day period, cures such default, or provides evidence sufficient to prove to Buyer's reasonable satisfaction that such default does not, in fact, exist. In addition to any other remedy available under law or in equity, Buyer shall be entitled to recover all actual damages, costs, losses and expenses, incurred by Buyer as a result of Seller's default, including, without limitation, cost of cover, reasonable attorneys' fees, court costs, and prejudgment and post-judgment interest at the maximum lawful rate. Additionally, in the event of a default by Seller, the City may remove Seller from the City's vendor list for three (3) years and any Offer submitted by Seller may be disqualified for up to three (3) years. All rights and remedies under the Contract are cumulative and are not exclusive of any other right or remedy provided by law.

#### 2.3.28 Termination Without Cause

Buyer shall have the right to terminate the Contract, in whole or in part, without cause any time upon thirty (30) days' prior written notice. Upon receipt of a notice of termination, Seller shall promptly cease all further work pursuant to the Contract, with such exceptions, if any, specified in the notice of termination. Buyer shall pay Seller, to the extent of funds Appropriated or otherwise legally available for such purposes, for all goods delivered and services performed and obligations incurred prior to the date of termination in accordance with the terms hereof.

#### 2.3.29 Fraud

Fraudulent statements by Seller on any Offer shall be grounds for the termination of the Contract for cause by Buyer and may result in legal action.

### 2.3.30 Delays

Buyer may delay scheduled delivery or other due dates by written notice to Seller if Buyer deems it is in its best interest. If such delay causes an increase in the cost of the work under the Contract, Buyer and Seller shall negotiate an equitable adjustment for costs incurred by the seller in the Contract price and execute an amendment to the Contract. Seller must assert its right to an adjustment within thirty (30) days from the date of receipt of the notice of delay. Failure to agree on any adjusted price shall be handled under the Dispute Resolution process specified in paragraph 49. However, nothing in this provision shall excuse Seller from delaying the delivery as notified.

### 2.3.31 Indemnity

#### a. Definitions:

- i. "Indemnified Claims" shall include any and all claims, demands, suits, causes of action, judgments and liability of every character, type or description, including all costs and expenses of litigation, mediation or other alternate dispute resolution mechanism, including attorney and other professional fees made against any of the Coalition members for:
  - damage to or loss of the property of any person (including, but not limited to Buyer, Seller, their respective agents, officers, employees and subcontractors; the officers, agents, and employees of such subcontractors; and third parties); and/or
  - (2) death, bodily injury, illness, disease, worker's compensation, loss of services, or loss of income or wages to any person (including but not limited to the agents, officers and employees of Coalition Members, Seller, Seller's subcontractors, and third parties),
- "Fault" shall include the sale of defective or non-conforming deliverables, negligence, willful misconduct, or a breach of any legally imposed strict liability standard.
- b. Seller shall defend (at the option of Buyer), indemnify, and hold Buyer, its successors, assigns, officers, employees and elected officials harmless from and against all Indemnified Claims arising out of, incident to, concerning or resulting from the Fault of Seller, or Seller's agents, employees or

SUBCONTRACTORS, IN THE PERFORMANCE OF SELLER'S OBLIGATIONS UNDER THE CONTRACT. NOTHING HEREIN SHALL BE DEEMED TO LIMIT THE RIGHTS OF BUYER OR SELLER (INCLUDING, BUT NOT LIMITED TO, THE RIGHT TO SEEK CONTRIBUTION) AGAINST ANY THIRD PARTY WHO MAY BE LIABLE FOR AN INDEMNIFIED CLAIM.

#### 2.3.32 Insurance

Insurance shall be provided as specified in the Supplemental Terms and Conditions.

#### 2.3.33 Claims

If any claim, demand, suit, or other action is asserted against Seller which arises under or concerns the Contract, or which could have a material adverse affect on Seller's ability to perform thereunder, Seller shall give written notice thereof to Buyer within ten days after receipt of notice by Seller. Such notice to Buyer shall state the date of notification of any such claim, demand, suit, or other action; the names and addresses of the claimant(s); the basis thereof, and the name of each person against whom such claim is being asserted. Such notice shall be delivered personally or by mail and shall be sent to Buyer and to the Austin City Attorney. Personal delivery to the City Attorney shall be to Norwood Tower, 114 West 7th Street, 5th floor, Austin, Texas 78701, and mail delivery shall be to P.O. Box 1088, Austin, Texas 78767.

#### 2.3.34 Notices

Unless otherwise specified, all notices, requests, or other communications required or appropriate to be given under the Contract shall be in writing and shall be deemed delivered three business days after postmarked if sent by U.S. Postal Service Certified or Registered Mail, Return Receipt Requested. Notices delivered by other means shall be deemed delivered upon receipt by the addressee. Routine communications may be made by first class mail, telefax, or other commercially accepted means. Notices to Seller shall be sent to the address specified in Seller's Offer, or at such other address as a party may notify the other in writing. Notices to Buyer shall be addressed to Buyer at P.O. Box 1088, Austin, Texas 78767 and marked to the attention of the Contract Administrator.

### 2.3.35 Rights to Bid, Proposal & Contractual Material

All material submitted by Seller to Buyer shall become property of Buyer upon receipt. Any portions of such material claimed by Seller to be proprietary must be

clearly marked as such. Determination of the public nature of the material is subject to the Open Records Act, Chapter 552, Texas Government Code.

### 2.3.36 No Warranty by Buyer Against Infringements

Seller represents and warrants to Buyer that: (i) Seller shall provide Buyer good and indefeasible title to the deliverables and (ii) the deliverables supplied by Seller in accordance with the specifications in the Contract will not infringe, directly or contributorily, any patent, trademark, copyright, trade secret, or any other intellectual property right of any kind of any third party; that no claims have been made by any person or entity with respect to the ownership or operation of the deliverables and Seller does not know of any valid basis for any such claims. Seller shall, at its sole expense, defend, indemnify, and hold Buyer harmless from and against all liability, damages, and costs (including court costs and reasonable fees of attorneys and other professionals) arising out of or resulting from: (i) any claim that Buyer's exercise anywhere in the world of the rights associated with Buyers' ownership, and if applicable, license rights, and its use of the deliverables infringes the intellectual property rights of any third party; or (ii) Seller's breach of any of Seller's representations or warranties stated in this Contract. In the event of any such claim, Buyer shall have the right to monitor such claim or at its option engage its own separate counsel to act as co-counsel on Buyer's behalf. Further, Seller agrees that Buyer's specifications regarding the deliverables shall in no way diminish Seller's warranties or obligations under this paragraph and Buyer makes no warranty that the production, development, or delivery of such deliverables will not impact such warranties of Seller.

### 2.3.37 Confidentiality

In order to provide the deliverables to the Buyer, Seller may require access to certain of Buyer's and/or its licensors' confidential information (including inventions, employee information, trade secrets, confidential know-how, confidential business information, and other information which Buyer or its licensors consider confidential) (collectively, "Confidential Information"). Seller acknowledges and agrees that the Confidential Information is the valuable property of Buyer and/or its licensors and any unauthorized use, disclosure, dissemination, or other release of the Confidential Information will substantially injure Buyer and/or its licensors. Seller (including its employees, subcontractors, agents, or representatives) agrees that it will maintain the Confidential Information in strict confidence and shall not disclose, disseminate, copy, divulge, recreate, or otherwise use the Confidential Information without the prior written consent of the Buyer or in a manner not expressly permitted under this Agreement, unless the Confidential Information is required to be disclosed by law or an order of any court or other governmental authority with proper jurisdiction; provided Seller

promptly notifies Buyer before disclosing such information so as to permit Buyer reasonable time to seek an appropriate protective order. Seller agrees to use protective measures no less stringent than Seller uses within its own business to protect its own most valuable information, which protective measures shall under all circumstances be at least reasonable measures to ensure the continued confidentiality of the Confidential Information.

### 2.3.38 Ownership & Use of Deliverables

Buyer shall own all rights, titles, and interests throughout the world in and to the deliverables.

- a. Patents. As to any patentable subject matter contained in the deliverables, Seller agrees to disclose such patentable subject matter to Buyer. Further, if requested by Buyer, Seller agrees to assign and, if necessary, cause each of its employees to assign the entire right, title, and interest to specific inventions under such patentable subject matter to Buyer and to execute, acknowledge, and deliver and, if necessary, cause each of its employees to execute, acknowledge, and deliver an assignment of letters patent, in a form to be reasonably approved by Buyer, to Buyer upon request by Buyer.
- b. .Copyrights. As to any deliverables containing copyrightable subject matter, Seller agrees that upon their creation, such deliverables shall be considered as work made-for-hire by Seller for Buyer and Buyer shall own all copyrights in and to such deliverables; provided, however, that nothing in this Paragraph 38 shall negate Buyer's sole or joint ownership of any such deliverables arising by virtue of Buyer's sole or joint authorship of such deliverables. Should by operation of law, such deliverables not be considered works made-for-hire, Seller hereby assigns to Buyer (and agrees to cause each of its employees providing services to Buyer hereunder to execute, acknowledge, and deliver an assignment to Buyer of) all worldwide right, title, and interest in and to such deliverables. With respect to such work made-for-hire, Seller agrees to execute, acknowledge, and deliver and cause each of its employees providing services to Buyer hereunder to execute, acknowledge, and deliver a work-made-for-hire agreement, in a form to be reasonably approved by Buyer, to Buyer upon delivery of such deliverables to Buyer or at such other time as Buyer may request.
- Additional Assignments. Seller further agrees to, and, if applicable, cause each of its employees to, execute, acknowledge, and deliver all applications, specifications, oaths, assignments, and all other instruments

which Buyer might reasonably deem necessary in order to apply for and obtain copyright protection, mask work registration, trademark registration and/or protection, letters patent, or any similar rights in any and all countries and in order to assign and convey to Buyer, its successors, assigns and nominees, the sole and exclusive right, title, and interest in and to the deliverables. Seller's obligation to execute, acknowledge, and deliver (or cause to be executed, acknowledged, and delivered) instruments or papers such as those described in this Paragraph 38 a., b., and c. shall continue after the termination of this Contract with respect to such deliverables. In the event Buyer should not seek to obtain copyright protection, mask work registration or patent protection for any of the deliverables, but should desire to keep the same secret, Seller agrees to treat the same as Confidential Information under the terms of Paragraph 37 above.

#### 2.3.39 Publications

All published material and written reports submitted under the Contract must be originally developed material unless otherwise specifically provided in the Contract. When material, not originally developed, is included in a report in any form, the source shall be identified.

### 2.3.40 Advertising

Seller shall not advertise or publish, without Buyer's prior consent, the fact that Buyer has entered into the Contract, except to the extent required by law.

### 2.3.41 No Contingent Fees

Seller warrants that no person or selling agency has been employed or retained to solicit or secure the Contract upon any agreement or understanding for commission, percentage, brokerage, or contingent fee, excepting bona fide employees of bona fide established commercial or selling agencies maintained by Seller for the purpose of securing business. For breach or violation of this warranty, Buyer shall have the right, in addition to any other remedy available, to cancel the Contract without liability and to deduct from any amounts owed to Seller, or otherwise recover, the full amount of such commission, percentage, brokerage or contingent fee.

#### 2.3.42 Gratuities

Buyer may, by written notice to Seller, cancel the Contract without liability if it is determined by Buyer that gratuities were offered or given by Seller or any agent or representative of Seller to any officer or employee of the City of Austin with a view toward securing the Contract or securing favorable treatment with respect to the awarding or amending or the making of any determinations with respect to the performing of such contract. In the event the Contract is canceled by Buyer pursuant to this provision, Buyer shall be entitled, in addition to any other rights and remedies, to recover or withhold the amount of the cost incurred by Seller in providing such gratuities.

### 2.3.43 Prohibition Against Personal Interest in Contracts

No officer, employee, independent Consultant, or elected official of Buyer who is involved in the development, evaluation, or decision-making process of the performance of any solicitation shall have a financial interest, direct or indirect, in the Contract resulting from that solicitation. Any willful violation of this section shall constitute impropriety in office, and any officer or employee guilty thereof shall be subject to disciplinary action up to and including dismissal. Any violation of this provision, with the knowledge, expressed or implied, of Seller shall render the Contract voidable by Buyer.

### 2.3.44 Independent Contractor

The Contract shall not be construed as creating an employer/employee relationship, a partnership, or a joint venture. Seller's services shall be those of an independent contractor. Seller agrees and understands that the Contract does not grant any rights or privileges established for employees of the City.

### 2.3.45 Assignment-Delegation

The Contract shall be binding upon and inure to the benefit of Buyer and Seller and their respective successors and assigns; provided, however, that no right or interest in the Contract shall be assigned and no obligation shall be delegated by Seller without the prior written consent of Buyer. Any attempted assignment or delegation by Seller shall be void unless made in conformity with this paragraph. The Contract is not intended to confer rights or benefits on any person, firm or entity not a party hereto; it being the intention of the parties that there be no third party beneficiaries to the Contract.

#### 2.3.46 Waiver

No claim or right arising out of a breach of the Contract can be discharged in whole or in part by a waiver or renunciation of the claim or right unless the waiver or renunciation is supported by consideration and is in writing signed by the aggrieved party. No waiver by either Seller or Buyer of any one or more events of

default by the other party shall operate as, or be construed to be, a permanent waiver of any rights or obligations under the Contract, or an express or implied acceptance of any other existing or future default or defaults, whether of a similar or different character.

#### 2.3.47 Modifications

The Contract can be modified or amended only by a writing signed by both parties. No pre-printed or similar terms on any Seller invoice, order or other document shall have any force or effect to change the terms, covenants, and conditions of the Contract.

### 2.3.48 Interpretation

The Contract is intended by the parties as a final, complete and exclusive statement of the terms of their agreement. No course of prior dealing between the parties or course of performance or usage of the trade shall be relevant to supplement or explain any term used in the Contract. Although the Contract may have been substantially drafted by one party, it is the intent of the parties that all provisions be construed in a manner to be fair to both parties, reading no provisions more strictly against one party or the other. Whenever a term defined by the Uniform Commercial Code, as enacted by the State of Texas, is used in the Contract, the UCC definition shall control, unless otherwise defined in the Contract.

### 2.3.49 Dispute Resolution

- If a dispute arises out of or relates to the Contract, or the breach thereof, a. the parties agree to negotiate prior to prosecuting a suit for damages. However, this section does not prohibit the filing of a lawsuit to toll the running of a statute of limitations or to seek injunctive relief. Either party may make a written request for a meeting between representatives of each party within fourteen (14) calendar days after receipt of the request or such later period as agreed by the parties. Each party shall include, at a minimum, one (1) senior level individual with decision-making authority regarding the dispute. The purpose of this and any subsequent meeting is to attempt in good faith to negotiate a resolution of the dispute. If, within thirty (30) calendar days after such meeting, the parties have not succeeded in negotiating a resolution of the dispute, they will proceed directly to mediation as described below. Negotiation may be waived by a written agreement signed by both parties, in which event the parties may proceed directly to mediation as described below.
- b. If the efforts to resolve the dispute through negotiation fail, or the parties waive the negotiation process, the parties may select, within thirty (30)

calendar days, a mediator trained in mediation skills to assist with resolution of the dispute. Should they choose this option, Buyer and Seller agree to act in good faith in the selection of the mediator and to give consideration to qualified individuals nominated to act as mediator. Nothing in the Contract prevents the parties from relying on the skills of a person who is trained in the subject matter of the dispute or a contract interpretation expert. If the parties fail to agree on a mediator within thirty (30) calendar days of initiation of the mediation process, the mediator shall be selected by the Travis County Dispute Resolution Center (DRC). The parties agree to participate in mediation in good faith for up to thirty (30) calendar days from the date of the first mediation session. Buyer and Seller will share the costs of mediation equally.

#### 2.3.50 Jurisdiction & Venue

The Contract is made under and shall be governed by the laws of the State of Texas, including, when applicable, the Uniform Commercial Code as adopted in Texas, V.T.C.A., Bus. & Comm. Code, Chapter 1, excluding any rule or principle that would refer to and apply the substantive law of another state or jurisdiction. All issues arising from this Contract shall be resolved in the courts of Travis County, Texas and the parties agree to submit to the exclusive personal jurisdiction of such courts. The foregoing, however, shall not be construed or interpreted to limit or restrict the right or ability of Buyer to seek and secure injunctive relief from any competent authority as contemplated herein.

### 2.3.51 Invalidity

The invalidity, illegality, or unenforceability of any provision of the Contract shall in no way affect the validity or enforceability of any other portion or provision of the Contract. Any void provision shall be deemed severed from the Contract and the balance of the Contract shall be construed and enforced as if the Contract did not contain the particular portion or provision held to be void. The parties further agree to reform the Contract to replace any stricken provision with a valid provision that comes as close as possible to the intent of the stricken provision. The provisions of this section shall not prevent this entire Contract from being void should a provision, which is the essence of the Contract, be determined to be void.

### 2.4 Supplemental Purchase Terms & Conditions (RFP)

The Supplemental Purchase Terms and Conditions contained herein amend or supplement the Standard Purchase Terms and Conditions in Section 2.3:

- A. The following changes are hereby made to the Standard Purchase Terms and Conditions:
  - Pursuant to Section 2.3.32, entitled *Insurance*, the following insurance requirement applies:

#### INSURANCE

### A. General Requirements

- (1) The Seller shall at a minimum carry insurance in the types and amounts indicated below for the duration of the Contract and during any warranty period.
- (2) The Seller shall forward Certificates of Insurance with the endorsements required below to the appropriate Coalition Member with copies to the Coalition Project Manger as verification of coverage within 14 calendar days after notification of award, unless otherwise specified.
- (3) Seller shall not commence work until the required insurance is obtained and has been reviewed by Buyer. Approval of insurance by the appropriate Coalition Member and City of Austin Project Manager shall not relieve or decrease the liability of Seller hereunder and shall not be construed to be a limitation of liability on the part of Seller.
- (4) Seller must submit certificates of insurance for all subcontractors to the City and appropriate Coalition Member prior to them commencing work on the project.
- (5) Seller's and all subcontractors' insurance coverage shall be written by companies licensed to do business in the State of Texas at the time the policies are issued and shall be written by companies with A.M. Best ratings of B+VII or better. The City will accept workers' compensation coverage written by the Texas Workers' Compensation Insurance Fund.
- (6) All endorsements naming the Buyer as additional insured, waivers, and notices of cancellation endorsements as well as the Certificate of Insurance shall contain solicitation number and the following information:

Attn: Vic Chanmugam, C.P.M Supervising Senior Buyer

City of Austin Purchasing Office P. O. Box 1088 Austin, Texas 78767

- (7) The "other" insurance clause shall not apply to the Buyer where the Buyer is an additional insured shown on any policy. It is intended that policies required in the Contract, covering both Buyer and Seller, shall be considered primary coverage as applicable.
- (8) If insurance policies are not written for amounts specified below, Seller shall carry Umbrella or Excess Liability Insurance for any differences in amounts specified. If Excess Liability Insurance is provided, it shall follow the form of the primary coverage.
- (9) Buyer shall be entitled, upon request and without expense, to receive certified copies of policies and endorsements thereto and may make any reasonable requests for deletion or revision or modification of particular policy terms, conditions, limitations, or exclusions except where policy provisions are established by law or regulations binding upon either of the parties hereto or the underwriter on any such policies.
- (10) Buyer reserves the right to review the insurance requirements set forth during the effective period of this Contract and to make reasonable adjustments to insurance coverage, limits, and exclusions when deemed necessary and prudent by Buyer based upon changes in statutory law, court decisions, the claims history of the industry or financial condition of the insurance company as well as Seller.
- (11) Seller shall not cause any insurance to be canceled nor permit any insurance to lapse during the term of the Contract or as required in the Contract.

- (12) Seller shall be responsible for premiums, deductibles and self-insured retentions, if any, stated in policies. All deductibles or self-insured retentions shall be disclosed on the Certificate of Insurance.
- (13) The Seller shall provide the City thirty (30) days written notice of erosion of the aggregate limits below occurrence limits for all applicable coverages indicated within the Contract.
- or control of the Seller, then Seller shall provide property coverage on an "All Risk of Physical Loss" form. The coverage shall be provided on a replacement cost basis for the 100% value of City or Coalition owned property. If property is being transported or stored off-site by Seller, then transit and storage coverage shall also be provided. The City or Coalition member shall be endorsed onto the policy as a loss payee.
- (15) The insurance coverages specified below are required minimums and are not intended to limit the responsibility or liability of the Seller.

### B. Specific Requirements

- (1) Worker's Compensation and Employers' Liability Insurance. Coverage shall be consistent with statutory benefits outlined in the Texas Worker's Compensation Act (Art. 8308-1.01 et seq. Tex. Rev. Civ. Stat.). The minimum policy limits for Employer's Liability are \$1,000,000 bodily injury each accident, \$1,000,000 bodily injury by disease policy limit and \$1,000,000 bodily injury by disease each employee.
  - (a) The Seller's policy shall apply to the State of Texas and include these endorsements in favor of the City of Austin:
    - (i) Waiver of Subrogation, Form WC420304
    - (ii) Thirty (30) days Notice of Cancellation, Form WC 420601

- (2) <u>Commercial General Liability Insurance.</u> The minimum bodily injury and property damage per occurrence are \$1,000,000 for coverages A and B.
  - (a) The policy shall contain the following provisions:
    - Blanket contractual liability coverage for liability assumed under this Contract and all Contracts related to this project.
    - (ii) Independent Contractor's Coverage.
    - (iii) Products/Completed Operations Liability for the duration of the warranty period.
    - (iv) Explosion, Collapse, and Underground Coverage (X,C,U)
  - (b) The policy shall also include these endorsements in favor of the City of Austin and/or applicable Coalition member:
    - (i) Waiver of Subrogation, Endorsement CG 2404
    - (ii) Thirty (30) days Notice of Cancellation, Endorsement CG 0205
    - (iii) The City of Austin and/or applicable Coalition member listed as an additional insured, Endorsement CG 2010
- (3) Business Automobile Liability Insurance. Seller shall provide coverage for all owned, non-owned and hired vehicles with a minimum combined single limit of \$1.000,000 per occurrence for bodily injury and property damage.
  - (a) The policy shall include these endorsements in favor of the City of Austin:
    - (i) Waiver of Subrogation, Endorsement TE 2046A

- (ii) Thirty (30) days Notice of Cancellation, Endorsement TE 0202A
- (iii) The City of Austin listed as an additional insured, Endorsement TE 9901B

### Professional Liability

Professional Liability coverage, at a minimum limit of \$1,000,000 per claim, to pay on behalf of the assured all sums which the assured shall become legally obligated to pay as damages by reason of any negligent act, error, or omission arising out of the performance of professional services under this Agreement.

If coverage is written on a claims made basis, the retroactive date shall be prior to or coincident with the date of the Contract and the certificate of insurance shall state that the coverage is claims made and indicate the retroactive date. This coverage shall be continuous and will be provided for 24 months following the completion of the contract.

- 3. The following Terms and Conditions are hereby incorporated and shall apply to this procurement:
  - Term of Contract: The term of any contract resulting from this solicitation will be dependent on the term proposed and is subject to negotiation between the City and the successful proposer.

City of Austin Request for Proposal No. RFP VC98300024 Issued on 6/22/98

# **SECTION 3.0**

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# 3.0 PROPOSAL PREPARATION & INSTRUCTIONS & EVALUATION FACTORS SOLICITATION NUMBER: VC98300024

# 3.1 General Information:

# Explanations Or Clarifications

Until the time of the pre-proposal conference, inquiries regarding the technical specifications, may be addressed to Danny Hobby, Assistant Director, Information Services, Tel (512) 499-6510. For inquiries of a contractual or procedural nature, please contact Vic Chanmugam, Supervising Senior Buyer at (512) 499-2030.

Written questions may also be sent to the attention of Vic Chanmugam at facsimile number (512) 499-2388 before 3:00 p.m. on August 24, 1998, or mailed to him at the Purchasing Office, 206 East 9<sup>th</sup> Street, Room 15.105, Austin TX 78701 clearly marked "VC98300024" and marked for his attention.

Responses to written questions will be made by way of addendum sent to all vendors who are registered with the Purchasing Office of the City of Austin as having received a Proposal.

Only replies by formal written addenda (amendments) shall be binding. Oral and other interpretations or clarifications shall not be binding on the City. Respondents are required to acknowledge all addenda (amendments) by signing and returning such document either with the Proposal or before the closing date.

After award of contract, any changes shall be by written Change Order executed by duly authorized signatories of both parties.

An additional opportunity to acquire responses to vendor inquiries will be provided at the pre-proposal conference. City officials working on this project as well as members of the Radio Communications Coalition will be available to answer questions during the pre-proposal conference.

# b. Pre-Proposal Conference

 The City will hold a pre-proposal conference on Wednesday, July 8, 1998, at 1:00pm in room 104 at Waller Creek Center, 625 East 10<sup>th</sup> Street, Austin, Texas.

# Bid Bond

The Proposer shall furnish, with their submittal, a Bid Bond full executed in the amount representing five percent (5%) of the total infrastructure costs of their proposal.

## d. Payment Bond

The Proposer to whom the award is made shall furnish a Payment Bond fully executed in the amount representing one hundred percent (100%) of the contract cost, upon ten (10) days notification of awards to cover payment to their subcontractors.

Such bond shall be subject to approval of the Law Department, City of Austin. The bond will be valid for twenty-four months from the date of the contract or until final system acceptance by the Coalition, whichever is latest.

## e. Performance Bond

The Proposer to whom the award is made shall furnish a Performance Bond fully executed in the amount representing one hundred percent (100%) of the contract cost, upon ten (10) days notification of award. In the event the contract is terminated by default, the Proposer shall be liable for the following costs:

- i. Reprocurement
- ii. Maintenance of interim service
- iii. Difference between defaulted contract rates and higher reprocurement
- iv. charges to the buyer (if any)
- v. All other identifiable applicable costs

Such bond shall be subject to approval of the Law Department, City of Austin. The bond will be valid for twenty-four months from the date of the contract or until final system acceptance by the Coalition, whichever is latest.

## f Taxes

Purchases of Goods or Services for City use are usually exempt from City, State, and most Federal Taxes. Proposals should not include exempted taxes. The successful Vendor should request a Tax Exemption Certificate from the Purchasing Office. Under no circumstances shall the City be liable to pay exempt taxes under any Contract.

# g Brand Name or Equal

If the Solicitation indicates brand name or "equal" products are acceptable, the Vendor may propose an "equal" product but must be prepared to demonstrate those features that render it equal. Final determination of a product as an "equal" remains with the City.

# h. Delivery Time

Delivery time, if stated as a number of days, will be based on calendar days. Time is of the essence in any City purchase. If the indicated date cannot be met or the date is not indicated, the Vendor shall state its best delivery time.

# i. Free on Board (FOB) Point

The Vendor should quote its lowest and best price, with the goods delivered to the place specified, at the Vendor's expense and risk, and there tender delivery to the City.

# <u>Prices</u>

Proposals shall be firm unless otherwise specified. In the event of a discrepancy between unit price and extended price, the unit price shall govern.

## k. Signature

The Vendor must sign each document in the Solicitation requiring a signature. Any change made to the Proposal must be initialed by Vendor.

## 1. Payment

Payment terms shall be net 30 days.

# 3.2 Proposal Format

Prefacing the proposal, the Proposer shall provide an Executive Summary which gives in brief, concise terms, a summation of the proposal. The proposal itself shall be organized in the following format and informational sequence:

- a. <u>Part I Business Organization</u>: State full name and address of your organization and identify parent company if you are a subsidiary. Specify the branch office or other subordinate element that will perform, or assist in performing, work herein. Indicate whether you operate as a partnership, corporation, or individual. Include the State in which incorporated or licensed to operate.
- b. Part II System Concept and Solution: Define in detail your understanding of the problem presented in the Scope of Work of this request for proposal and your system solution. Provide all details as required in the Scope of Work, the Request for Proposals, Section 16 of the RFP, and any additional information you deem necessary to evaluate your proposal.
- c. Part III Program: Describe your technical plan for accomplishing required work. Include such time-related displays, graphs, and charts as necessary to show tasks, sub-tasks, milestones, and decision points related to the Statement of Work and your plan for accomplishment. Specifically indicate:
  - A description of your work program by tasks. Detail the steps you will take in proceeding from Task 1 to the final tasks.
  - The technical factors that will be considered in section above, and the depth to which each will be treated.
  - iii. The degree of definition provided in each technical element of your plan.
  - iv. The points at which written, deliverable reports will be provided.
  - v. The amount of progress payments you are requesting upon successful completion of milestones or tasks, deducting ten percent (10%), which will be paid upon final acceptance by the City.
  - vi. A statement of your compliance with all applicable rules and regulations of Federal, State and Local governing entities. Proposer must state his compliance with terms of this Request for Proposal.
- d. Part IV Project Management Structure: Provide a general explanation and chart which specifies project leadership and reporting responsibilities; and interface the team with City project management and team personnel. If use of subcontractors is proposed, identify their placement in the primary management structure, and provide internal management description for each subcontractor.
- e. <u>Part V Prior Experience</u>: Describe only relevant corporate experience and individual experience for personnel who will be actively engaged in the project. Do not include corporate experience unless personnel assigned to this project

actively participated. Do not include experience prior to 1975. Supply the project title, year, and reference name, title, present address, and phone number of principal person for whom prior projects were accomplished.

f. Part VI - Personnel: Include names and qualifications of all professional personnel who will be assigned to this project. State the primary work assigned to each person and the percentage of time each person will devote to this work. Identify key persons by name and title. Provide all resumes.

# g Part VII - Non-Collusion, Non-Conflict of Interest, and Anti-Lobbying:

Proposers, including their agents, representatives, and subconsultants shall not undertake any activities or actions to promote or advertise their proposal to any member of the Austin City Council, Commissioners Court of Travis County, City staff or County staff except in the course of City or County sponsored inquiries, briefings, interviews, or presentations between the proposal submission date and award by City Council. Any violation of this provision may result in disqualification of the Proposer.

- i. Proposers, including their officers, owners, agents, representatives, subconsultants, employees, or parties in interest:
  - (1) shall not in any way collude, conspire or agree, directly or indirectly, with any person, firm, corporation or other Proposer or potential Proposer in regard to the amount of their proposal or the terms or conditions of their proposal.
  - (2) shall not pay, or agree to pay, directly or indirectly any person, firm, corporation or other Proposer or potential Proposer, any money or anything of value in return for assistance in procuring or attempting to procure a contract or in return for fixing the prices in the proposal or the proposal of any other Proposer. Proposers shall not pay money or anything of value in the future for these purposes.
  - (3) must attest that they had no involvement in the development, preparation, evaluation, or other decision making process for this solicitation, and that should the Proposer receive a contract award in response to their proposal, no agent, representative, consultant or subconsultant affiliated with the Proposer, who may have been involved in the development, preparation or evaluation or other decision making process for this solicitation, will have any financial interest, direct or indirect, in said contract.

- (4) must state that there are no other potential or actual conflicts of interest regarding this solicitation.
- (5) shall certify that none of the deciding factors set forth in the request for proposal or in the subsequent agreement were their idea or the idea of anyone representing their company, unless the suggestion was made at a meeting open to all Proposers, which all Proposers had notice of.
- (6) shall certify that no officer or stockholder of their company is an employee of the City of Austin, or an employee of any elected official of the City, or is related to any employee or elected official of the City of Austin.
- (7) shall not have undertaken or will not undertake any activities or actions to promote or advertise their proposal to any member of any City Commission reviewing the proposals, member of the Austin City Council or City staff except in the course of Citysponsored inquiries, briefings, interviews or presentations between the date that the Request for Proposal was issued and the date of award by City Council.
- Proposers shall sign and return with their proposal, the affidavit of Non-Collusion, Non-Conflict of Interest, and Anti-Lobbying located at the end of this section.

## h. Part VIII - Non-Solicitation

During the term of the Contract, and for a period of one (1) year thereafter, Contractor (including, if applicable, Contractor's parent and related companies) shall not, and agrees not to, (directly or indirectly) hire, employ, attempt to hire or employ, nor solicit for employment or consulting services any employee of the City of Coalition or former employee of the City of Coalition who was employed by the City or Coalition at any time during the term of the Contract. In the event the foregoing is breached, Contractor shall immediately pay liquidated dames to the City or Coalition member equal to the greater of: (i) one (1) year of such employee's new compensation or (ii) two hundred percent (200%) of such employee's compensation on an annual basis while employed by the City or Coalition member. Further, this provision shall survive termination of the Contract and Contractor shall reimburse the City or Coalition member for any fees and expenses incurred in the enforcement of this provision.

# i. Part VIII - Equal Opportunity:

- Equal Employment Opportunity: No Vendor, or Vendor's agent, shall engage in any discriminatory employment practice as defined in chapter 74, 1992 City Code. No Proposal submitted to the City shall be considered, nor any Purchase Order issued, or any Contract awarded by the City unless the Vendor has executed and filed with the City Purchasing Office a current Non-Discrimination Certificate. Proposers shall sign and return with their proposal, the Non-Discrimination Certification located at the end of this section.
- Americans With Disabilities Act (ADA) Compliance: No Vendor, or Vendor's agent shall engage in any discriminatory employment practice against individuals with disabilities as defined in the ADA.
- j. <u>Part IX Minority/Women Owned Business Enterprise (MBE/WBE)</u> <u>Participation:</u>

It is the policy of the City of Austin to involve certified Minority owned Business Enterprises (MBE) and Woman owned Business Enterprises (WBE) in City contracting. The City has established specific goals for MBE/WBE contract participation in this solicitation. Specific MBE/WBE participation requirements are detailed with accompanying documentation in Section 20 of this RFP document.

The Proposer's signature on their Proposal will indicate their acknowledgement of their obligations under the City's MBE/WBE Ordinance and their intention of complying with these requirements.

- k. <u>Part X Proposal Acceptance Period</u>: All proposals must include a statement that they are valid for a minimal period of one hundred and eighty (180) days subsequent to the RFP closing date.
- Part XI Proprietary Information: All material submitted to the City becomes public property and is subject to the Texas Open Records Act upon receipt. If a Proposer does not desire proprietary information in the proposal to be disclosed, each page must be identified and marked proprietary at time of submittal. The City will, to the extent allowed by law, endeavor to protect such information from disclosure. The final decision as to what information must be disclosed, however, lies with the Texas Attorney General. If the Proposer fails to identify proprietary information, he agrees that by submission of his proposal those sections shall be deemed non-proprietary and available upon public request.
  - m. <u>Part XII Authorized Negotiator</u>: Include name, address, and telephone number of person in your organization authorized to negotiate contract terms and render binding decisions on contract matters.

- n. Part XIII Cost Proposal: In addition to a completed response to Section 17 of the RFP, information described in the following subsections is required from each Proposer. Your method of costing may or may not be used but should be described. Where a firm fixed price contract not appropriate, as in custom tailoring of the system to meet the needs of specific agencies which was not spelled out in this RFP, hour rates for different categories of personnel will be specified. Ten percent (10%) of the total contractual price will be retained until submission and acceptance of all work products.
  - Manpower--Itemize to show the following for each category of personnel with separate hourly rates:
    - (1) manager, senior consultant, analyst, subcontractor, etc.
    - (2) estimated hours for each category of personnel
    - (3) rate applied for each category of personnel
    - (4) total cost
  - ii. Itemize cost of supplies and materials
  - iii. Other itemized direct costs
  - If applicable, general and administrative burden. Indicate base used, percentage, and total cost relative to this procurement.
  - v. Travel expenses. Specify travel cost separately. City shall reimburse contractor for actual out-of-town travel expenses incurred for food, lodging and transportation, hotel and flight accommodations provided such expenses are reasonable. The City's judgment shall prevail in any dispute arising over the reasonableness of such expense. All expenses will be reviewed against the Runzheimer Meal-Lodging Index by the Budget Office. All invoices must be accompanied by copies of receipts (hotel bills, airline tickets, etc.). No reimbursement will be made for expenses not actually incurred.
  - vi. Printing. State separately the cost of furnishing copies of the final report (if applicable).
  - vii. Total cost schedule.

# 3.3 Exceptions:

Proposers must strive to comply with all requirements set forth in the RFP. All proposals meeting the intent of the RFP will be considered for negotiations. Proposers taking exception to the specifications, or offering substitutions, shall clearly state <u>all</u> exceptions in their proposal. In stating exceptions to these specifications, proposers shall clearly discuss what portion of the specification they are taking exception to, and how and why they cannot, or will not, comply. <u>Veiled exceptions, such as "partially compliant" or "clarification" may be treated as exceptions, and will affect your evaluation scoring.</u> The absence of such a list of exceptions shall indicate that the proposer has not taken exception, and the Coalition shall hold the proposer responsible to perform in strict accordance with the specifications of the RFP.

Proposers are strongly encouraged to carefully review these specifications prior to the Pre-proposal conference so that any mandatory requirements that would keep them from responding may be discussed. The Coalition reserves the right to accept any and/or all/none of the exception(s)/ substitution(s) as deemed to be in the best interest of the Coalition.

# 3.4 Proposal Preparation Costs:

All costs directly or indirectly related to preparation of a response to the RFP, including costs associated with bonding requirements, travel to and from Coalition facilities for any pre-award on-site visits, or any oral presentations required to supplement and/or clarify a proposal which may be required by this procurement shall be the sole responsibility of and shall be borne by Offeror(s). All responses to this RFP become the property of the City of Austin.

## 3.5 Evaluation Factors & Award:

a. <u>Competitive Selection</u>: This procurement will comply with applicable City of Austin Policy. The City of Austin has determined that this is a "high technology procurement" as defined within the Texas Local Government Code, Section 252.021 and 252.042. This statute, as last amended effective August 1995, provides for acquiring certain equipment, goods, or services of a highly technical nature through the use of competitive sealed proposals, rather than competitive sealed bids. Proposers should be familiar with the provisions of Sections 252.021 and 252.042 as it governs this procurement. The successful Proposer will be selected by the City on a rational basis. As this is a Request for Proposals, and not an Invitation for Bid, award will not be made to the lowest bid meeting specification, but to the best evaluated proposal. Evaluation factors outlined in

Paragraph b below shall be applied to all eligible, responsive Proposers in comparing proposals and selecting the successful Proposer. Award of a contract may be made without discussion with Proposers after proposals are received. Evaluation will take place in two stages. The first stage will be a technical evaluation only, and prices will remain sealed until this stage has been completed. After the technical evaluation is completed, the sealed envelopes with the prices will be opened and a financial evaluation will take place.

# b. Evaluation Factors:

- All proposals will be evaluated based on the following criteria and rankings.
- ii. Evaluation criteria is as follows:
  - A. System Design and Solution (45 of 100 points)
    - System Design The coalition is interested in the how the system will be designed to meet the needs as defined in the RFP. Areas of concern include, but are not limited to:
      - Redundancy of the system and the methodology of providing the proposed redundancy
      - The type and suitability of the equipment proposed
      - The proposed network configuration
      - The scalability of system for expansion
      - Ability to connect and utilize existing networks
      - Use of Open Architecture
      - · Features and Functions provided
      - Meets equipment specifications
      - Guaranteed radio coverage
      - Reliability of equipment/System
      - · Fallback modes of operation
    - System Interfaces and System Integration
    - System Maintenance and Support Services
  - B. System Pricing for all equipment & services (30 of 100 points)
    This will include, but is not limited to:
    - System backbone

- Special subsystems
- Equipment pricing
- Trade-in allowance and other discounts
- Installation costs
- Maintenance pricing for the first five years after acceptance
- · Cost of upgrades to equipment or software
- Warranty Costs
- Other costs
- Overall costs
- C. Vendor experience & ability to provide System (10 of 100 points) This will include, but is not limited to:
  - Financial/Corporate Stability
  - Proposer's Applicable Experience with projects of similar size and scope
  - Applicable Experience and Technical Expertise of Proposed Staff
  - Quality and Depth of References
  - Proposed Project Staff
  - Sub-Contractor's Applicable Experience and Technical Expertise
  - Proposed Project Manager
- Project Plan (10 of 100 points)
   This will include, but is not limited to a scrutiny of:
  - Key Team Leaders, including project experience and length with firm
  - Proposed Team Structure
  - · Communication with Coalition Project Team
  - Migration Plan
  - Implementation Plan
  - Testing/Acceptance Procedure
  - •
  - Feasibility, Timeliness, and Quality of the Implementation Schedule
  - Extent and Quality of Documentation Provided
- E. System Training (5 of 100) points
  - Training Plan and Methodology

- Applicable Experience and Technical Expertise of Proposed Staff
- Demonstrated ability to provide required training
- F. Interview/Demonstration (25 points additional, if selected for presentation by Coalition Project Team)
  - The Coalition Project Team may determine that it is necessary to interview "short-listed" proposers prior to making a recommendation. Interviews of "short-listed" firms is anticipated for this project.
  - The interview process should last approximately 1-½ to 2 days and will include a presentation by the proposer, a question and answer period, and a 'hands-on' demonstration of the proposed product. The presentation should be made by the proposer's project staff, but the presentation team must include the proposed Project Manager. The anticipated schedule for any such interviews is expected to be similar to that shown below:
    - Morning of DAY 1 Proposer's presentation
    - Afternoon of DAY 1 Q&A
    - DAY 2 Product Demonstration
- c. Contract Payment and Retainage: The contract shall be prepared under the direction of the City, and shall incorporate all applicable provisions. A firm fixed price or not to exceed contract is contemplated, with progress payments as mutually determined to be appropriate. In addition to progress payment deductions, ten percent (10%) of the total contractual price will be retained until submission and acceptance of the final work products. These payments shall be based upon milestones completed as proposed by the Proposer.

# 3.6 Submission of Proposals

All proposals must be received prior to 2:00 p.m., October 5, 1998, at the City of Austin, Purchasing Office, 206 East 9th Street, II Commodore Plaza, Suite 15:120, Austin, Texas. Late proposals will not be accepted. Proposers must submit 1 original and 15 copies of their proposal with all exhibits, one copy of which shall be unbound and suitable for making additional photocopies for evaluation team members. Cost proposals shall be submitted in a separate sealed envelope.

- a. <u>Documents required with Proposal</u>: The following documents must be submitted with each Proposal prior to the Due Date:
  - i. the signed Offer and Award Sheet;
  - ii. the signed Non-Discrimination Certificate;
  - the signed Affidavit of Non-Collusion, Non-Conflict of Interest, and Anti-Lobbying;
  - iv. the signed MBE/WBE Compliance Plan, if applicable;
  - any other document included in the Solicitation requiring completion or execution by the Vendor; and
  - vi. any additional document required by the Solicitation.

All other pages in the Solicitation should be retained by the Vendor.

b. Mailing: Proposals and Compliance Plans (when required by the solicitation), must be returned in a sealed envelope or container marked on the outside with the:

Vendor's name & address Solicitation number Due date and time.

i. If a MBE/WBE Compliance Plan is required, it may be submitted with the sealed Proposal or in a separate sealed envelope. If the Compliance Plan is included with the Proposal, the outside of the envelope must indicate that the Compliance Plan is included. If the Compliance Plan is submitted in a separate envelope, the outside of the envelope must identify the contents as the "Compliance Plan" and must also include the Vendor's name & address, the Solicitation number, and the Due Date and time. If a Compliance Plan is required but is not submitted prior to the time set forth in the Solicitation, the Proposal will not be accepted for consideration.

ii. When sending a Proposal and/or Compliance Plan, use the proper address for the type of service desired, as shown below.

P.O. Address for US Mail	Street Address for Hand Delivery or Courier Service
City of Austin	City of Austin
Purchasing Office	Purchasing Office
P.O. Box 1088	Two Commodore Plaza
Austin, Texas 78767-8845	206 E. 9th St. 15th floor, Suite 15.120 Austin, Texas 78701
	Phone: (512) 499-2500

Note: Proposals (including Compliance Plans) that are not submitted in a sealed envelope or container will not be considered.

- Unless authorized in the Solicitation, telegraphic or facsimile Proposals will not be accepted.
- c. Addendum: Receipt of an Addendum must be acknowledged by signing and returning the Addendum with the Proposal or under separate cover prior to the Due Date. The Addendum must be returned in a sealed envelope marked on the outside with the Vendor's name, address, the Solicitation number, and the Due Date and time.
- d. <u>Late Proposals</u>: Proposals must be received in the Purchasing Office prior to the Due Date. All Proposals received after the Due Date are considered late and will be returned to the Vendor unopened. The time stamp clock on the receptionist's desk in the Purchasing Office is the time of record and is verified daily with the local time service (KBVO-TV at 973-3555). It is the sole responsibility of the Proposer to ensure timely delivery of the Proposal. The City will not be responsible for failure of service on the part of the U.S. Postal Office, courier companies, or any other form of delivery service chosen by the Vendor.

# 3.7 Modification or Withdrawal of Proposals

- a. <u>Modification of Proposals</u>: Proposals may be modified in writing at any time prior to the Due Date.
- b. Withdrawal of Proposals: Proposals may be withdrawn in writing, telegraphically, or by facsimile (provided that the facsimile is signed by the Vendor) at any time prior to the Due Date. A Proposal may also be withdrawn in person by a Vendor, provided the withdrawal is made prior to the Due Date. A receipt of withdrawal must be signed by the Vendor. Withdrawn Proposals may be resubmitted, with or without modifications, up to the Due Date.

# 3.8 Opening of Proposals

As authorized by Tex. Local Government Code Section 252.049(b), Proposals will be opened in a manner that avoids disclosure of the contents to competing Proposers and keeps the contents confidential during negotiations. Until the negotiations are completed, only the number and identity of the Vendors submitting Proposals will be made available to the public.

#### 3.9 Reservations

The City expressly reserves the right to:

- specify approximate quantities in the Solicitation;
- extend the Solicitation closing date and time;
- waive as an informality, minor deviations from specifications provided they do not affect competition or result in functionally unacceptable Goods or Services;
- waive any minor informality in any Proposal or Solicitation procedure (a minor informality is one that does not affect the competitiveness of the Vendor);
- e. add additional terms or modify existing terms in the Solicitation;
- f reject or cancel any or all Proposals;
- g. reissue a Solicitation; and/or
- h. procure any item by other means.

# 3.10 Negotiations

The City reserves the right to negotiate all elements which comprise the successful Proposer's response to ensure that the best possible solution for the City and the Coalition is selected.

# 3.11 Incorporation of Proposal into Final Contract

Respondents should be aware that it is the intention of the City that this Request for Proposal and the contents of the successful proposal will become part of the subsequent contract documents. It is therefore in the interests of the Proposer to thoroughly review and understand this document and seek any clarifications required. Failure of the Proposer to accept this obligation may result in the cancellation of any award. Any damages accruing to the City as a part of the Proposer's failure to contract may be recovered from the Proposer.

## 3.12 Release of Information

Submission of information relative to this RFP shall not be released by the City during the proposal evaluation process or prior to contract award. Proposers are advised that the successful Proposer's response will be deemed to be an offer which will be incorporated and become part of the contract to be negotiated between the City and the successful Proposer.

Any proprietary information contained therein will be subject to the provisions of the Texas Open Records Act. If the vendor does not desire proprietary information in the proposal to be disclosed, the vendor is required to identify all proprietary information contained therein page by page, rather than by a blanket clause indicating that the entire proposal is proprietary. Vendors are advised that the confidentiality of their proposals will be protected by the City to the extent permitted by law. Proposers should be aware that the decision whether such proprietary information may be withheld will not be made by the City but by the Office of the Attorney General of the State of Texas.

# 3.13 Post Proposal Documents Required from Successful Proposer

- a. <u>Letters of Intent</u>: When a MBE/WBE Compliance Plan is required, the successful Proposer must submit to the Contract Awarding Authority the Letters of Intent to subcontract required by the Compliance Plan within three (3) business days after notification. <u>Failure to submit the required letters will be grounds for rejection of</u> the Proposal.
- b. <u>Certificates of Insurance</u>: When insurance is required, the Vendor must provide Certificates of Insurance in the amounts and for the coverages required to the Purchasing Office within 14 calendar days after notification of award, or as otherwise required by the Solicitation.
- e. <u>Payment and/or Performance Bonds</u>: When Payment and/or Performance Bonds are required, the Vendor must provide the bonds, in the amounts and on the conditions required, within 14 calendar days after notification of award, or as otherwise required by the Solicitation.

# 3.14 Modifications to Scope of Work

In the event that sufficient funds do not become available to complete each task in the scope of work, the scope of work may be amended, based upon the cost breakdown outlined in the cost proposal

In the event that additional services are required as identified herein, the Coalition reserves the right to add such services by amending the scope of work.

## ATTACHMENT 1

## AFFIDAVIT

Entities submitting qualification statements, including their agents and representatives, shall not undertake any activities or actions to promote or advertise their qualification statement to any member of the Austin City Council or City staff except in the course of City-sponsored inquiries, briefings, interviews, or presentations between the qualification statement submission date and award by City Council. Any violation of this provision may result in disqualification of the entity. Entity shall execute by signature the following Entity's Affidavit of Non-Collusion, Non-Conflict of Interest, and Anti-Lobbying and return the signed affidavit with their qualification statement. The Affidavit form follows.

## ATTACHMENT 1

# CITY OF AUSTIN ENTITY'S AFFIDAVIT OF NON-COLLUSION, NON-CONFLICT OF INTEREST, AND ANTI-LOBBYING

- (1) Neither I nor any of my officers, partners, owners, agents, representatives, employees, or parties in interest, have in any way colluded, conspired, or agreed, directly or indirectly, with any person, firm, corporation or other entity submitting a qualification statement on this project or potential participant in this procurement action in regard to the terms or conditions of this qualification statement. I have not paid or agreed to pay, directly or indirectly any person, firm, corporation or other entity submitting a qualification statement on this project or potential participant in this procurement action, any money or anything of value in return for assistance in obtaining or attempting to obtain the contract anticipated to result from this procurement action. I will not pay any money or anything of value in the future for that purpose.
- (2) None of the deciding factors set forth in the Request for Qualifications (RFQ) or in the subsequent agreement were my idea or the idea of anyone representing my company, unless the suggestion was made at a public meeting.
- (3) No officer or stockholder of my company is an employee of the City of Austin or any elected official of the City, or is related to any employee or elected official of the City of Austin that will exercise authority in the selection of the project consultant.
- (4) My agents, representatives, subconsultants and I will not undertake any activities or actions to promote or advertise my proposal to any member of any City Commission reviewing the proposals, member of the Austin City Council or City staff except in the course of City-sponsored inquiries, briefings, interviews or presentations between the qualification statement submission date and award by City Council.

Signature:	Date:
Printed Name:	
Title:	
Firm/Entity:	

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## 4.0 USER REQUIREMENTS

This section will provide a description of the organization and function of each agency participating in this study, along with a description of their current system, a summary analysis of each agencies' problems and concerns, and a description of the needs and wants of each agency. These needs and requirements will then be summarized in a tabular format. In addition, descriptions of existing communications facilities as well as the existing 9-1-1 system will be provided. All drawings and exhibits can be found at the end of this section.

# 4.1 City of Austin

# 4.1.1 Police Department

# ⇒ Agency Organization and Function

The Austin Police Department (APD) provides law enforcement and investigative services throughout the City of Austin. In addition, the Narcotics officers cover four counties via a shared Drug Enforcement Agency (DEA) Metro Task Force. Other wide-area operations include the Strategic Weapons and Tactics (SWAT)/Hostage Negotiators, which typically stay within the County. The Austin Police Bomb Squad serves 15 counties centered around Austin. In addition, various operations require joint operations between the Austin Police Department and other agencies which including the Travis County Sheriff's Office and the Texas Department of Public Safety, for tactical situations.

APD consists of four Bureaus and includes a total authorized head count of 1,154 Sworn personnel, and 523 civilian personnel. The four Bureaus are:

- · Community Policing
- Community Policing Support
- Professional Standards
- Administrative Services

Several divisions within these bureaus were interviewed specifically for this report. These include the following:

- Administration
- Patrol
- Communications
- Motor Traffic Division (Motor)
- Victim Services Division
- Criminal Investigations Support Bureau (CISB)
- SWAT
- Special Investigations Division

APD is currently under a transition from standard police operations to Community Policing. Under this concept the APD is attempting to use the public more as a resource to support Police Operations. APD is currently undergoing a major reorganization to facilitate Community Policing, which will be implemented over the next year.

# Community Policing Bureau

The Community Policing Bureau of the Austin Police Department includes approximately 700 officers. This is the largest bureau within APD and the biggest user of radio equipment. They are responsible for responding to citizen's calls for service, handling traffic stops, and general law enforcement and peace-keeping operations throughout the City of Austin. They have secondary responsibility for providing support to the University of Texas at Austin, State Buildings, Municipal Airport, City Parks, and the School District. The level of their support to these agencies varies. For example, the Parks Police is lightly staffed. As a result, a large quantity of incidents that occur within the Parks are responded to initially by an APD Patrol unit before a Parks Officer can arrive on the scene. The University of Texas at Austin is supported by its own internal police force, but may require assistance from APD for major investigations, traffic control, and crowd control.

Under the new organizational plan, the City of Austin is divided operationally into six (6) sectors. Each patrols sector will be managed by a Commander. The Sector Commander will be responsible for all activities within that geographic area. To facilitate this, each sector will have seven uniformed patrol shifts, a street response unit, detectives assigned specifically to that sector, motorcycle shift, and other support personnel. In addition, the two Central Sectors will have walking beat shifts. Central-West will also have a Mounted Patrol unit. There are eight to ten patrol districts for each of the six sectors, which are organized geographically by call volume. As a result, the size of any given patrol district varies significantly.

Each patrol vehicle is equipped with a mobile radio. Portable radios are issued at the beginning of the shift from a pool of radios. In addition, patrol vehicles are equipped with a mobile data terminal. When the Mobile Data Terminal (MDT) system is working, all calls are dispatched via MDT, high priority calls are also dispatched by voice. The Patrol Bureau has three police sub-stations which are: Downtown, East Austin, and North Austin (a South sub-station is planned for 1998).

The Police Department owns 44 motorcycles, plus 6 spares. These motorcycles are equipped with mobile radios, and the rider wears a portable unit.

There are also mounted officers on horseback. This includes six patrol officers, one Sergeant, and one Lieutenant. This Lieutenant is also responsible for the walking beat officers. Walking Beat includes four shifts of eight officers each. Of these eight officers,

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four patrol on foot, and four patrol on bicycles. In addition, there are four supervisors. The walking beat unit also has two paddy wagons (van). These vehicles are equipped with mobiles and are driven by a Walking Beat officer. There are never more than two shifts on duty at one time, typically totaling about 12 officers. These officers share the same radio channel as Central-West sector patrol units. They typically operate on Wednesday, Thursday, Friday, and Saturday, with the heaviest radio use (peak call load) between 10:00 a.m. and 3:00 a.m.

The License and Weight Bureau is responsible for inspection of the vehicles, City-wide. They have 12 mobile units including supervisors, a total staff of 16 officers plus two supervisors. This unit shares the same Lieutenant with the Abandon Vehicles Unit. They are also equipped with four vehicular charger units.

CISB includes all the various investigative branches of the Austin Police Department. It is centralized at headquarters and includes approximately 145 sworn officers for investigations. At this time, CISB is divided into two primary groups which are Crimes Against Persons and Crimes Against Property.

## Victim Services Division

The Victim Services Division of APD is part of the Community Policing Support Bureau. This Division has 15 to 16 counselors who are called to the scene by an officer and handle crisis intervention. They are equipped with four vehicles and have three crisis teams. They patrol by Sector for a full shift. They receive a radio call from the Dispatcher, then talk to an officer at the scene while enroute and take a portable unit into the scene. Victim Services makes extensive use of volunteer counselors. These volunteers ride with a full-time counselor and also use a portable unit. In addition, a plan for disaster counseling team comprised of metropolitan area professional counselors has been implemented. Known as Project A.L.E.R.T., this allows the call-back of a large number of professional counselors during disaster situations.

# Strategic Weapons and Tactics (SWAT)

The Austin Police Department SWAT Unit consists of 13 officers who work out of Police Headquarters. The SWAT unit serves fugitive warrants for the Police Department. In addition, they respond to hostage situations and other critical incidents within the Austin area. Approximately 70% of SWAT's work week involves serving warrants throughout the area.

The SWAT Unit is not formally dispatched as the Patrol Division is. The SWAT Unit is called out by management personnel within the Department on an "as needed" basis. SWAT utilizes cellular telephones heavily for communications at SWAT activities. The cellular phones are used for both field-to-office communications as well as car-to-car communications. SWAT envisions that they will continue to utilize the cellular phones

because they have provided satisfactory operation and they provide full-duplex communications in which officers can both listen and speak at the same time. Full-duplex communications is very important in this aspect of Police business because timing is critical in their work. Full duplex capability allows any person on the SWAT team to jump in and communicate on a moment's notice. The cellular phones currently utilized by the group are manufactured by Oki and are equipped with headsets. In the event that the City develops a new 800 MHz trunked radio system, the SWAT unit will be interested in testing full-duplex trunked radios for communications during SWAT events.

During a typical SWAT event, the SWAT unit sets up a react team that is generally located in proximity of the actual scene, and a command post is established at a greater distance for command and control functions. Frequently, the unit runs a field phone between the command post and the react team. The field phone also provides full duplex communication capability.

SWAT also provides support for dignitary protection details (DPD). This includes local DPD functions as well as providing assistance to the U.S. Secret Service, Texas Department of Public Safety, Department of State, and Federal Bureau of Investigation.

The Explosive Ordnance Detail (EOD) is a part of SWAT. This unit supplies services to Austin-Travis County and fifteen (15) surrounding counties. This unit is comprised of three (3) bomb technicians and they are equipped with five vehicles.

## **Technical Unit**

The Police Department's Technical Unit supports the SWAT team and Narcotics group by programming radios on an as needed basis for special events. The Tech Unit also sets up the mobile Command Post and delivers the Command Post to incident locations. The mobile Command Post is officially known as the Incident Command Vehicle (ICV).

## Special Investigations Division (SID)

The Special Investigations Division consists of three sections including:

- Street Crimes Section
- Major Crimes Section 1
- Major Crimes Section 2

The City's Narcotics unit operates in the Street Crimes Section. The APD Narcotics Unit operates a street unit that includes cars and officers who meet with drug dealers and make undercover buys or purchases of narcotics. The Narcotics group also conducts long term investigations which frequently last from three months to a year and a half.

The Special Investigations Division routinely operates with a variety of other agencies including:

- Travis County Sheriff
- •Drug Enforcement Agency (DEA)
- Internal Revenue Service (IRS)
- ·U.S. Customs
- Alcohol, Tobacco, and Fire Arms (ATF)
- Federal Bureau of Investigation (FBI)
- ·Secret Service

## Negotiation

The APD Negotiation unit currently consists of six negotiators and a commander. The Negotiation team is dispatched on every SWAT team call.

# ⇒ Current Systems

The APD Dispatch facility is located at 715 E. 8th Street, on the fourth floor of APD headquarters. This is a 12-year old building and includes approximately a 2500 square foot area for dispatch for Police, Fire, and Emergency Medical Services (EMS) departments, 9-1-1 call reception, and other functions. There are six APD dispatch positions and two dispatch supervisor consoles. There are ten 9-1-1 call-taker positions which take the initial 9-1-1 call for all services and transfer as necessary to other agencies, such as the Fire and EMS Departments. If the 9-1-1 call requires Austin Police Department response, the 9-1-1 call-taker will enter the information directly into the CAD terminal. This facility also houses the PBX for the entire facility and the teletype operations. Dispatchers are currently using Centra-Com I consoles. In 1994, this facility handled 744,956 E 9-1-1 calls. Historically, this call volume has increased between 4% - 8 % per year over the last eight years.

Dispatch operations are divided into six sectors corresponding with the six patrol units in the Police Department. Each sector has one primary dispatch channel. On Friday and Saturday nights, there is an additional walking beat on 6th Street. During this peak time, a seventh sector is set up with a dispatcher operating from one of the supervisor consoles on either Channel 7 or Channel 8. Since there are still two supervisors on duty, this operation yields both a dispatcher and a supervisor sharing one of the supervisor operating positions. Turnover at their facility is currently about 25% per year.

APD frequencies are set up as follows:

- •APD Channels 1 6 are for the six patrol zones
- •APD Channel 7 is TAC, also used by narcotics, warrants, etc.
- •APD Channel 8 city-wide, also used by narcotics, warrants, etc.

•APD Channel 9 - Narcotics/Vice, is not in the consoles and is not used often •APD Channel 12 - Motor Units, has encryption (but is not operational at this time)

Block diagrams of these channels are shown in Exhibits 3-1 through 3-9.

Every dispatch position is equipped alike. Channels 1 - 8, and the VHF inter-city channel (which is rarely used) are at every position. All radios have data signaling to provide unit identification on all channels Radios also have an emergency button to alert the dispatcher when an officer is in trouble. However, this feature provides more false emergency alerts than actual emergencies. This identification system does provide an alias from the radio serial number to a four-digit number. The dispatch then looks up in a table which unit is represented by that four-digit number. All call-taker and dispatch positions are equipped with instant recall recorders. These units record all radio channels, except channels 7 and 8. The primary logging recorder is a Dictaphone unit using DAT recording media. It is 40-channel unit, approximately two years old. This unit is set up to record all radio, 9-1-1, PBX and supervisory console audio. There is also one old 7-digit telephone number used by alarm companies which gets fed into the 9-1-1 system as a lower priority, and is recorded.

At this time, APD is ready to add additional patrol sectors based on call volume in the City. There are existing plans to create new North and South sectors by carving out space between A & B, and D & F Sectors. This plan will be difficult to implement until it can be supported by communications.

## SWAT

The SWAT Unit operates a mobile Command Post, which is a 1979 vintage 30 foot book-mobile that has been retrofitted for SWAT operations. The Command Post is currently equipped with two VHF and two UHF Desktrac mobile radios, six cellular telephones, one Sabre portable with Convertacom, AC power generator, one mobile data terminal, and battery backup power system to run the vehicle for approximately 10 to 12 hours.

The SWAT Unit recently purchased five new Spectra 9000 UHF mobile radios with voice encryption capability and five Spectra VHF radios without encryption capability to replace the existing equipment in the Command Post. The new Spectra radios will also be equipped with headsets for use within the vehicle.

In addition to the cellular phones, the SWAT unit also utilizes the Police Department's Channel 8 UHF frequency and operates three Motorola Sabre portables equipped with encryption capability. In addition, the Department also utilizes a number of older Motorola MX360 portable radios. These radios are not capable of voice encryption. The Unit indicated that they could use more of the Saber units if they were available.

SWAT currently works very closely with Travis County SWAT Unit and also with the Department of Public Safety SWAT team. APD SWAT utilizes the Police Department's Channel 8 frequency. Travis County SWAT also has this frequency in their radio for coordination purposes with APD.

SWAT personnel indicated that they have found battery consumption to be a real problem with handheld radios. Heavy radio activity in extended SWAT situations frequently exhaust batteries before the events are completed. SWAT personnel have to replace batteries on the radios to keep the radios active. Conversely, most of the cellular telephones they use are utilized inside vehicles or near vehicles. Accordingly, cellular telephones are generally plugged into the car's 12 volt cigarette lighter and can sustain continuous operation as needed.

## Victim Services Division

Counselors from the Victim Services Division have a mobile in the car and approximately six portables assigned to their Division. The quality of the radio equipment is inadequate. This division needs a minimum of 18 portable units and four mobile radios.

The Victim Services Division is part of a state-wide response team and as such is among the highest in the department for its need of communications with other agencies. As part of the State-wide Response Team, they travel to many other areas across the State. It may be appropriate to assign several programmable radios to this group or to assign some radios exclusively on mutual aid channels for this purpose.

Due to the nature of their work, these counselors often get involved in longer conversations with the officers at the scene. During these conversations, they switch to Channel 7 or 8 if they are not busy. Otherwise they have a problem with their ability to communicate using the radio system. One Crisis Team works out of the North sub-station and two Crisis Teams work out of the East sub-station. They carry cellular telephones to allow them contact with their supervisors. No control station is needed at the sub-stations for their operation.

## **Negotiation Teams**

Each of the negotiators is equipped with their own Motorola Visar portable radio and they operate on APD Channels 7 and 8.

## Narcotics

The Narcotics Unit is dispatched from a facility away from Headquarters. They will need three new control stations (desktop radios) at that location, each of which will be equipped with three desktop remotes for personnel use. The actual control station radio does not need to be equipped with a desk mike.

The Narcotics group occupies an entire floor in the building. They have reported that inbuilding coverage at that location with the current radio system is very poor due primarily to the type of construction of the building.

Narcotics personnel utilize APD radio Channels 7, 9, and 12. Narcotics personnel indicate that Channel 12 does not work well at all.

The Narcotics Unit indicated that they need five channels or talkgroups in the new system developed by the City. They currently uses both mobile and portable radios in their day-to-day operations. They also utilize a variety of vehicles seized in drug operations. Most of the operations undertaken by the Narcotics are covert in nature, and the rapid changing of seized vehicles makes it difficult to repeatedly install and remove mobile radios from these vehicles. Once the new communications system has been developed and implemented, and portable radio coverage becomes more reliable, Narcotics could eliminate the use of mobile radios in favor of an all portable approach.

#### Patrol

As the largest user of radio equipment in the Police Department, Patrol is particularly sensitive to deficiencies in the radio system. There is particular concern when there are three shifts out at once and the voice radio channels become very crowded.

There are significant reports of interference through the City. Users often receive traffic related to the Houston Police Department, sometimes at very strong signal strengths.

Coverage is also of significant concern with the Patrol Bureau of APD. There are many dead spots both downtown and throughout the outskirts of town. Some of these areas are completely dead while in other areas officers can hear dispatch but are unable to respond. In the short term the department is looking at adding voting receivers and possibly moving transmitter sites.

Another serious concern of officers in the field is the age of equipment currently in use. Much equipment is seen as approaching or beyond its period of reliable service. In addition, there is a significant variety of different makes and models of equipment in use in the City.

Another significant concern with the Patrol Bureau is congestion on the channels. This is of particular concern in Zone B, which often has double the number of active users as other districts.

As with other police radio users across the City, Motor Traffic officers have noted many significant deficiencies in the existing communication system. These are described below:

A few coverage dead areas exist for portables and mobiles, blamed mostly on terrain.

There is a mix of different kinds of equipment, and the repeater is considered in poor condition. The console is about eight years old and some mobiles are 8-10 years old. The call-check and logging recorders are also old.

Skip interference is frequently experienced, especially from Beaumont and Cedar Park. Interference can be so great that West Lake Hills units have conversed with the skipped agencies. Some channel bleed over occurs from EMS, especially their call-out tones.

Since West Lake Hills is in the Austin area, which is the State Capital, there are frequently other agencies from elsewhere in the state that come to town and use their radios, which may be on West Lake Hills' channels and cause interference.

Weather seems to cause other interference, where high speed bursts of signaling from Southwestern Bell is heard during the night.

The Police Department is unable to communicate with Austin Police Department units working the same or nearby incidents due to VHF-UHF differences, except when APERN is activated. Rollingwood contacts West Lake Hills Police Department on the latter's channel.

Power failures at Police Department dispatch frequently brings the communications system down until the back-up generator starts running (10-20 second delay). There is no back-up power at the repeater site.

### ⇒ Needs and Wants

The Austin City Radio Shop currently maintains West Lake Hills equipment, and West Lake Hills is very pleased with the service provided. They hope this will continue with the new system.

West Lake Hills Police Department desires interoperability from dispatch and mobiles with the following agencies: TCSO (south); TC VFD #1; Rollingwood Police; Austin Police; Sunset Valley; and Intercity.

### 4.3.9 Media

The various forms of news media operating within Travis County currently gather a significant portion of their news information by monitoring the various radio channels operated by the Public Safety agencies within the County. Since all of the Public Safety agencies currently operate conventional two-way radio systems, it is very easy for members of the news media to purchase inexpensive scanning receivers at a local Radio

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Shack or department store to monitor Police, Fire, and EMS communications. Such activities are not illegal and are routinely practiced throughout the United States.

If the Coalition agencies purchase and implement a county-wide 800 MHz trunked radio system, it will become much more difficult for members of the news media to utilize their scanners to monitor radio communications traffic that occurs on the new system. Scanners have been designed to sequentially monitor channels in a selected list of frequencies programmed into the unit. When a Police or Fire Department operates a conventional radio network like those currently in use in Travis County, the Police, Fire, and EMS activities always occur on the same dedicated radio frequencies. This makes it very easy for the public to program those dedicated frequencies to their scanners and routinely monitor communications traffic on those frequencies.

A trunked radio system differs in that the system provides a common pool of shared frequencies that are utilized on a demand basis by all of the agencies that operate on the new system. Each time a user agency wishes to communicate, the site controller (computer) at the tower site automatically selects one of the radio channels from the common pool of channels and assigns it to the user for that particular conversation. When the conversation has been completed, that radio channel is placed back in the pool of available channels for the next user agency. As a conversation progresses within a particular agency, each time the conversation changes direction, it may also change frequencies or radio channels. In a 30 channel system, each time a particular radio user depresses the push-to-talk button, he or she may be assigned a different radio channel for Since the trunking system randomly assigns that portion of the conversation. conversations to different channels, it is extremely difficult for a scanner to follow the conversation through the variety of channels that may be utilized for that particular conversation. In most cases, the scanner would only pick up small bits and pieces of the overall conversation.

Once the Coalition makes a decision to develop and implement a trunked radio system, the various news media agencies will almost certainly contact the Coalition for permission to purchase and operate handheld radios capable of monitoring activity on the new radio system. This situation has already occurred in numerous cities throughout the United States. Typically, most cities allow various news media organizations to purchase their own radio and operate it on the trunked system in a receive only mode. This means that news media would not be allowed to transmit or communicate on the trunked radio system at all. Radio equipment purchased by the media would be programmed to operate on selected talkgroups within the trunked system.

This will allow the media to monitor selected talkgroups, or channels, within the new communications system. Law enforcement agencies will have the ability to encrypt, or scramble, sensitive communications which are not suitable for public monitoring. Encryption capability will prevent the public and news media from monitoring sensitive or

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tactical communications. Voice encryption is routinely utilized in Police, Fire, and EMS agencies throughout the United States.

Once the Coalition has made a decision to purchase and implement a trunked radio system, the Coalition should also develop a policy to accommodate the news media's desire for communications access.

- One major problem is that there are not enough channels to support current operations. There are significant problems with radio congestion on the voice channels particularly during peak activity. The Sector F Channel experiences severe skip interference problems from the City of Houston. There are dead spots throughout the City for portable users, particularly when operating inside buildings. In addition, there are some areas which exhibit poor coverage even with mobile radios.
- Another significant problem is the lack of interoperability with other agencies. APD is frequently called upon to work with other public safety and public service agencies as well as utility companies. The ability of APD officers to coordinate with such agencies is very restricted at this time.
- While congestion has been reported on virtually all channels, it is especially evident in Sector B, which is Channel 3. This is result of the high volume of activity that goes on during peak periods in the downtown area, both by Patrol units and non-patrol units forced to share the channel.
- Another problem seen in the system is that many of the portable units do
  not have scan capability and those units that do have this capability are limited in
  their functionality.
- There are also problems with communications due to the non-uniformity of equipment, both in dispatch and in the field. For example, it has been reported that when a dispatcher comes on duty, the audio is garbled. Officers in the field suspect that this is due to problems caused by the use of a different headset by the dispatcher. There are several concerns about the Motorola SABER radio. One observation is that SABER radios do not sound as good to receiving units as do the older MX radios. Another concern is that they do not appear to hold up to adverse weather conditions as well as the MX.

# Special Investigations Division (SID)

When working coordinated events with other agencies, SID currently has to swap radios with those agencies in order to communicate with their personnel. It would be helpful if SID units could communicate directly with those agencies without the swapping of radios. SID personnel have found, however, that most of the agencies are very reluctant to allow APD units to operate on their radio channels. Many of those agencies also utilize voice encryption formats that are unlike the format utilized by APD, making communications impossible in encrypted modes.

Special Investigations uses APD radio Channels 7, 9, and 12 for day-to-day communications operations. Channel 9 does not support voice encryption, but is supported by satellite receive sites to help improve portable radio communications.

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Channel 12 is equipped with voice encryption capability, but does not have the benefit of satellite receiver voting which results in inadequate coverage in many areas of the City.

Within the new communications system, the Negotiation team will need two radio channels or 800 MHz talkgroups for their dedicated use. Talkgroups will be utilized for coordination between negotiation sites at incidents scene. The Negotiation Unit is also equipped with a single vehicle that has a mobile radio and cellular telephone installed.

Collectively, SWAT, SID, Narcotics, and Negotiations need the ability to communicate with one another at an incident scene. In the event the City develops a new 800 MHz trunked radio system, it should all be equipped with the dynamic regrouping and the capability to create incident storm plans on an as needed basis. These units also need the ability to communicate through the VHF inter-city network to communicate directly with other law enforcement personnel operating throughout the County who may not operate on the City's frequencies.

# Dispatch Center

At this time there are no Austin Fire or EMS channels available to the APD dispatchers. CAD is the only communications capability between these agencies. As a result, the dispatchers are frequently required to call up the other dispatchers by telephone, using a 4-digit number.

There have been many concerns expressed with the capability of the current telephone system. This phone system has noisy lines, and often when calls are transferred from a 9-1-1 call-taker to EMS, a loud "wind-tunnel" sound is heard. The 9-1-1 Call-taker has to hang up to avoid this additional noise. Since there are no speed dials, any calls between the dispatch agencies have to be manually dialed. In addition, the dispatch positions do not support both telephone and radio audio in the same headset. This is seen as a new requirement in the new facility. Due to loud background noise on many of the phone lines, the dispatcher must often hang up and call again after initially placing a call.

Problems with the dispatch facility include the following items:

- The facility does have backup power. However, recently the generator failed briefly. The cause of the failure has been corrected.
- It will be critical in a new facility that all console, CAD, radio, lights, and the Heating, Ventilation, and Air Conditioning (HVAC) is provided with appropriate back-up power.
- An additional complaint during power failure is that the system generates a "beep" on the radio channels throughout the period of power failure and is annoying to all users on the system.

- Another concern with the facility is its location which is adjacent to Interstate 35.
   This is a Hazardous Materials (HazMat) route and there is no backup dispatch facility.
- As a result of limitations in the facility, coupled with its location next to the HazMat route, it is acknowledged that a new location must be found for 9-1-1 and dispatch operations. No specific location has been identified.
- No route diversity for the 9-1-1 trunks into the facility
- The "back room" houses the critical electronics for the dispatch equipment, microwave, radio, comparators, 9-1-1, logging recorders, and PBX. This room leaks when it rains. It also is the location for the bathroom used by all dispatcher and call-taker personnel. As a result, critical equipment is located in a high-traffic area.
- Room lighting is perceived by dispatcher as being inadequate, with complaints of
  glare on some call-taker work screens. This has caused arguments among the
  personnel as to who has to sit in these positions. All lights are controlled by a
  single switch.
- The air circulation is inadequate, especially at dispatcher positions D and F. These positions are often much hotter than others, and the dispatchers choose to use small fans to try to keep cool. Unfortunately, the fans create additional background noise during the dispatch operations.
- The facility overcrowding is making it difficult to comply with the American Disabilities Act (ADA) requirements.
- Although furniture is ergonomic and is adjustable, employees consider it uncomfortable for shift work. There many reports of carpal tunnel syndrome among workers; an average of two to six people are out on sick leave at any given time due to this problem.
- In general, there is a high level of concern about quality.
- The acoustic conditions are far too noisy due to the brick walls in the facility. In addition, the 9-1-1 printer is located right behind the supervisor which adds significantly to the noise at that position.

- The break area is very small and is shared by police dispatchers, 9-1-1 call-takers, fire dispatchers and EMS dispatchers. There is no garbage disposal in the small sink which results in problems and backs up frequently.
- Smokers have to go up to the roof because there is no "indoor" smoking area.
   This is of particular concern to supervisors who smoke since they are completely cut off from the facility during this time.

There is poor inter-communications with other agencies. For example, in order to contact Travis County Sheriff or the Department of Public Safety, it is necessary to dial a 7-digit number. This is obviously time-consuming and ineffective during critical events such as a high-speed chase. The County now has Austin Police CAD terminals in the Sheriff's Office dispatch facility. This allows the two agencies to send CAD messages back and forth but is too slow an operation for real-time incident support. The CAD system is beyond its specified capacity, and as a result, is very slow during peak periods.

An additional problem reported, is that the walking beat officers portable radios are inadequate. It is difficult for these officers to hear their radio in a crowd, and they often have to yell into a microphone when they need help. These officers need some kind of ear piece or phone mic in order to listen and talk during operations in the crowded 6th street area.

When asked to define the worst problems, communications staff identified the following items:

- Limited space available and resulting overcrowding
- Age of the equipment
- Environmental conditions
- Coverage problems

# Criminal Investigations Support Bureau (CISB)

The unreliability of existing equipment is cited as the biggest problem with CISB officers. Another significant problem is that the portable radios currently used are too large to effectively conceal. Quantities are far too low. For example, there are more cars than there are mobile radios. In addition to assigning a portable radio to every officer, the police department needs approximately 200 spare portable radios.

Another problem identified by CISB is unreliable coverage. This is particularly evident when going inside buildings.

Another effort in which they are involved is "Project Alert." In this project, psychologists volunteer to help as needed. As many as 500 of these people can be accessed by pager. At this time there is no further communication with them after the initial alert by pager. It

would be beneficial, if there were available some low cost, simplified, portable radios to handout to Project Alert personnel. Such radios would be limited to one or two talkgroups without scan or emergency button. A quantity of 50 such radios would be appropriate. In addition, due to the need for these operations to travel across the State, suitcase repeaters would be beneficial to support remote operations. Some examples of a need for this were the Oklahoma City bombing, and the incident in Waco, Texas.

#### ⇒ Needs and Wants

### Patrol Bureau

There are a variety of needs both operationally, functionally, and in terms of equipment requirement that have been revealed by interviews with APD Patrol Officers. These include the following.

Many users would like to use earphones for several reasons. They are seen as having an advantage over standard lapel microphones in terms of being easier to hear and in terms of not being overhead by other parties in the vicinity.

It is clear that the patrol officers do not want vehicle chargers. RCC concurs with this approach, as vehicle chargers often create problems with reliability in public safety applications.

Radio channels required to support patrol operations include one primary dispatch per sector, plus a secondary channel for each sector and five city-wide TAC channels. In addition, it has been suggested that air time and congestion on these operating channels could be reduced by having a separate dedicated channel for teletype requests. This would allow officers directly requests records and other support services without having to relay the message through a Dispatcher.

Patrol officers would like to have the ability to place telephone calls from the field either with cellular phones or through their radio. It is unclear if this desire can be met in the new system.

Officers see a strong need for channel scan capability. However, many radios in current use are difficult to program as to which channels are scanned. The ideal solution for the user would be the basic style in which there are a series of buttons on the face of the mobile radio and the officer can push the button to select if that channel is part of the scan list. All police radios do require scan capability.

The officers acknowledge that there have been problems with inadvertently pushing the emergency button and sending a false emergency signal to the dispatcher. They suggest that a shrouded or otherwise protected emergency button be provided to reduce this problem.

In general there is a strong need for greater uniformity at the button configurations across the different radios. This is of particular concern because of the wide variety of radios in use today. It is strongly desired that the radios in use within the police department be uniform rather than diverse models.

Mutual aid is of particular concern to APD. There are a wide number of agencies with which communication is desired in order to enhance operations. These include:

- Texas Department of Public Safety
- University of Texas
- Austin Fire Department
- Austin Department of EMS
- Travis County Sheriff's Office and other County agencies
- Capitol Police
- All agencies which border around Travis County

The motorcycle officers require a boom mic or other device to allow them to talk on the radio without requiring the use of their hands. In addition, push-to-talk should be mounted on the handlebar of the motorcycle so that at no time does the officer need to take his hands off of the handlebar in order to operate the radio.

Officers would like to keep their portables as permanently assigned equipment and be equipped with personal battery chargers so that they can charge their batteries at home while off duty. At this time there are not enough radios to handle three overlapping shifts; significantly higher number of radios is required by the Police Department.

Each of the three police sub-stations require desktop radios. Two of the sub-stations need one control station with a remote and the capability to add more remote units. The east sub-station requires two desktop radios; one for the Senior Sergeant, and one for the Watch Commander. Similar provisions will be required in the new South substation in 1998.

Mobile radio installations must be "air bag friendly." There have been significant issues in other police departments that have arisen due to neglecting this requirement.

APD officers expressed a strong need that the new system be flexible and dynamic to support the type of operations that are necessary in providing police support to a large city. Another issue raised by these users is the desire for a portable "take-home" radio, each equipped with a battery charger.

Encryption capability is required on all Police Department radios. It will be of particular significance to operations by plain clothes and undercover officers.

Under the reorganization plan, detectives, motorcycles, and street response units will be assigned to each of the six patrol sectors. They will work almost exclusively within that sector. This plan will require that additional talkgroups be created for each sector to accommodate this additional voice traffic and to provide secure transmissions for critical investigations.

### Dispatch Center

The new Austin police dispatch facility requires the following minimum dispatch positions:

- Dispatch positions
- TAC dispatchers
- Training Dispatch positions
- Supervisor positions
- Additional space to add more sectors

The primary 9-1-1 call-takers require a minimum of two additional call-taker positions, for a total of 12 positions, plus space for additional expansion for four more positions in the future, and the 9-1-1 supervisor.

The typical patrol officer in the field requires a public safety speaker/microphone/antenna (SMA) unit to allow him to put the speaker microphone on the uniform lapel. Officers want both a portable and mobile radio on the new system. APD would like to permanently assign portable radios to all officers. This would require a total quantity of 1,200 portable radios. There are significant advantages to this method of operation in terms of equipment reliability, equipment life, and officer effectiveness. In addition, the dispatch facility should be able to program an alias for each radio into the system from the dispatch center. One significant concern of APD patrol officers is that they operate in 10-hours shifts. This has been a problem with the portable radio battery duration. While on a walking beat, officers choose not to carry a spare battery and require batteries that can last throughout the shift.

More tactical talkgroups are required for Police operations A talkgroup plan for a single patrol sector would be as follows:

- Primary dispatch talkgroup per sector
- Operations/secondary dispatch talkgroup per sector
- Street Response Unit talkgroup per sector
- Two (2) talkgroups for detectives per sector
- 5 tactical talkgroups per sector

Every channel on the system needs to be available at the dispatch facility, at least to the supervisors. Encryption should be supported on all police operating channels. Over the

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air re-programming is a strongly desired feature to eliminate the logistic problems of distributing encryption keys.

The dispatch facility requires CRT based console positions. Improved office furniture with ergonomic features are also required.

Currently, cellular phones are used by some officers, including narcotics officers, and Special Operations. However, it has been noted by the Police Department that cellular phones do not operate reliably during crisis situations when cellular systems become overloaded.

At this time APD does have communications capability across different field users for the most part, with the Parks Police, Airport Police, and City Marshals. In addition, they have some communications with the Hospital Police Department which is being disbanded and replaced with private security operations.

APD Field users cannot currently communicate with Fire Department or EMS personnel, or with surrounding jurisdictions law enforcement, or other Public Safety operations. They cannot talk to the Sheriff's Office, which currently operates on VHF. At one time, they had a cross-connect repeater for communications with the Sheriff's department but the license for that operation has expired and was not renewed. Some APD units carry a VHF radio in addition to their UHF radio for communications with the Sheriff's Office.

In general, intercommunications and inter-operations with other agencies is a significant problem which reduces the effectiveness of APD Operations. This need for inter-communications includes not only public safety agencies but also public service agencies inside and surrounding the City.

### Criminal Investigations Service Bureau (CISB)

Encrypted voice operation is considered a mandatory requirement within CISB. In addition, there are several agencies within the Police Department that need dedicated encryption key codes which are not shared with other units within APD. These groups include Internal Affairs, Special Operations, and Narcotics. All other police units do require encryption to provide security from the outside world but do not need to be secured from other APD police officers.

The Commercial Auto-Theft Group is required to travel well outside the County boundaries in the performance of their duties. To support communications during such events, their vehicles are equipped with a second radio in VHF. This second radio will still be required in some units after moving into the new radio system. Many groups within CISB could make occasional use of a portable system that could be taken on the road and set up at a remote site outside the County. Another feature which is requested is the ability to make telephone calls from their radios.

Mutual aid is of significant concern within CISB; there are many agencies outside of CISB with which they require communications. Homicide requires communications with the County Medical Examiners Office. Child Abuse requires communication with the Austin Independent School District. Robbery needs communications with the FBI on occasions. Narcotics requires communication in various instances with the following agencies:

- FBI
- DEA
- ATF
- Secret Service
- IRS Criminal Investigations
- Texas Rangers
- Texas Department of Public Safety

The Texas DPS will keep their own radio, plus carry a local County radio in their car to achieve communications with the new system.

The STAR Flight helicopter assists in searches after armed robbery incidents. Patrol units need to be able to communicate with the STAR Flight crew in order to coordinate responses and clear landing zones. It is possible that APD-will acquire and staff two (2) helicopters in the foreseeable future.

At this time CISB units operate on the channel of whatever Sector they happen to be in. There are no dedicated channels at this time for CISB, Channel 7 & 8 are difficult to use because of their shared nature.

The following channels are identified as required on the new system by CISB:

- Patrol Talkgroups all primary dispatch and detective talkgroups,
- Scan
- CISB common channel
- One CISB channel for each Division
- Homicide
- Robbery

Control stations are required in CISB offices. This totals ten desk top mobile units.

CISB units require smaller portable radios. Since these officers do not wear gun belts, they are sensitive to the need for a light and easy-to-carry unit. CISB units also require ear-pieces and surveillance accessories. These officers do not generally use public safety speaker/microphone/antenna units.

#### Victim Services

Victim Services Division has counselors that go to the scene of crimes against persons and certain family-related disturbance calls. Three crisis teams roam throughout the city during a shift. Each team has a car with an MDT and a portable radio. Counselors are transmitted information on victims from the CAD system. Counselors complete a form that could be entered from an MDT. Counselors would prefer to have the capability to check prior history on victims and previous calls from counselors.

Communications with EMS and Fire Departments is strongly required. The call volume of this group is typically 12 calls per team, per week. In addition to the counselors discussed above, there are other units within Victim Services which travel in the field and use radios. These units include Child Abuse, and Family Violence.

Victim Services also coordinates and manages Project A.L.E.R.T., which provides professional counselors during critical events or disasters. In the event that A.L.E.R.T. personnel are activated, there will be a need for a cache of portable radios to be distributed to them on a temporary basis.

# **SWAT**

In planning the new radio communications system, SWAT personnel indicated they needed the following channels, or talkgroups, in the new system, specifically designated for their use:

- Negotiators
- Snipers
- Entry
- Common Channel (full duplex operation required)
- Command
- Staging
- Perimeter Control

They also have a large need for reliable voice operated transmit (VOX) headsets for any non-full duplex radio they might utilize.

In those cases where the SWAT Unit travels outside of Travis County to provide assistance to other agencies, the Unit needs talkaround capability in its radios to provide radio communications when away from their home repeater system. A transportable repeater system would be even more helpful in that it would provide greater range when they are operating at remote locations. Such a portable repeater should also be equipped with voice encryption to protect sensitive information.

# 4.1.2 Austin Fire Department

# ⇒ Agency Organization and Function

The Austin Fire Department (AFD) provides fire suppression, first responder medical services, technical rescue services, hazardous materials response, water rescue response, fire safety public education, fire investigations services, fire/safety inspections, hazardous materials inspections and review, and plans review within the City of Austin. AFD responds to calls for services within the COA and surrounding area, and also maintains mutual aid and other contract agreements with other agencies/entities within Travis, Hays and Williamson counties.

AFD currently supports approximately 221 square miles in and around Austin. This service area is forecast to grow to 245 square miles within 10 years. The current population served is approximately 590,000, which is expected to grow to 650,000 by 2008.

AFD is organized into the following divisions:

- Administrative Services
  - Office of Emergency Management
- Operations
  - Technical Rescue Team
  - Airport Fire Rescue (AFR)
  - Dive Team
  - Hazardous Materials Team
- Operations Support
  - Maintenance
  - Communications
  - Training
  - Medical Operations
- Prevention
  - Investigations
  - Inspections
  - Public Education
  - Plans Review
  - Hazardous Materials Inspections/Review

AFD currently operates 37 fire stations including Aviation Fire Rescue (AFR) stations at Mueller and Bergstrom Airports. AFR/Mueller, AFR/Bergstrom, and Station 14 at Mueller, have trucks equipped with VHF-AM aircraft radios capable of communicating with the airport control tower. The City is divided into six geographic areas called

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Battalions. In addition to traditional fire fighting, rescue, and Haz-Mat responses, AFD also provides first responder medical response for EMS.

AFD personnel are dispatched from the Fire Dispatch Center located within Police Headquarters. AFD does not currently operate a backup dispatch center, however, there are plans being developed to utilize the Emergency Operations Center (EOC) at City Hall as a back-up dispatch facility.

Incoming calls for service are initially answered by 9-1-1 call-takers at the Austin Police Department. Calls requiring AFD responses are routed to AFD Dispatch Center by the 9-1-1 call-taker. AFD assistance can also be requested by APD and EMS dispatchers. In 1997, AFD made 43,635 emergency responses. Over the past five years, emergency response has increased by approximately 66%.

Staffing at the Fire Dispatch Center is maintained by utilizing 4 separate shifts. There are 4 personnel assigned to each shift, with a minimum of 3 person staffing required at all times.

- Incoming calls for service generally conform to the following sequence:
- Fire call taker answers incoming call transferred from the 9-1-1 call-taker, or a request for assistance from APD or EMS dispatcher.
- Fire call-taker enters call information into the City's CAD system and routes the call information to the Fire dispatcher via the CAD system.
- Fire dispatcher examines the call information to determine if the CAD recommendation for dispatch is appropriate. If the recommended fire unit or units are in service on the air, those units are dispatched using the appropriate radio channel. If the recommended unit or units are in service at a fire station, the dispatcher alerts the appropriate station or stations utilizing a Zetron fire station alerting system. The Zetron station alerting system utilizes AFD channel 6 as the main station alerting channel. AFD channel 4 is the back-up station alerting channel.

Once the appropriate unit or units have been assigned to the incident, the CAD system routes call information to the responding units via an MDT in the assigned fire unit. Dispatching, call information, unit status and messaging is accomplished by voice radio and the MDT network.

### ⇒ Current Systems

The Austin Fire Department currently utilizes an eight channel UHF analog conventional radio system. This radio system is used for station alerting, emergency dispatching, routine radio communications, and Knox Box operations.

The primary transmitter for channels 1-6 is located at the Ridge Oak tower site. Channel 7 transmitter is located at the Mt. Larson tower site. There is an additional transmitter for channel 2 located at the Martin Hill tower site. AFD Dispatch is linked to these transmitter sites via the city's microwave system. In the event of a failure of the microwave system or any of these transmitter sites AFD would be limited to dispatching from back-up transmitters at APD headquarters.

AFD channels 1 through 6 are referred to as "citywide" channels because they are supported by a citywide system of satellite receivers. Many of these satellite receivers are located at AFD Fire Stations. These satellite receivers are linked back to a voting comparator at Police Headquarters via leased telephone circuits and/or the city's Microwave system. Occasionally there problems with these phone circuits which affect the overall performance of the satellite receiver system. This reduces the overall effectiveness of AFD's communication system. Channels 7 and 8 do not utilize a satellite voting receiver system.

AFD currently operates approximately 175 portable radios, 125 mobile radios, and 60 MDT's.

Fire stations that are equipped with satellite receive equipment, are also equipped with auxiliary backup power.

Fire channels 1 through 6 are utilized as follows:

- Channel 1 Fireground tactical operations (453.775 MHz)
- Channel 2 Fireground tactical operations (453.150 MHz)
- Channel 3 Medical/Rescue Response This channel is used for joint Medical/Rescue responses with Austin EMS (453.500 MHz)
- Channel 4 Aircraft Emergency Response. This channel is used for all responses involving AFR units at Mueller and Bergstrom airports. This is also the back-up channel for the Zetron station alerting system. (453.100 MHz)
- Channel 5 General AFD communications. (Routine radio traffic, single unit response, general information and messaging, unit status) (453.450 MHz)

 Channel 6 - Fire Station alerting channel utilizing the Zetron alerting system (453.900 MHz)

The configurations of these channels are shown in Exhibits 3-10 through 315.

Unless otherwise designated, all fire units routinely operate on Channel 5 until specifically assigned to another working channel.

- Channel 7 Primarily utilized for administrative use. This channel supports Fire Investigations, Fire Inspections, and Training. This is also a back-up channel for communications with EMS STAR Flight operations. Channel 7 is a single-site channel and is not equipped with satellite voting receivers. (453.275 MHz)
- Channel 8 Primarily used for unit to unit communication. This channel is not monitored in Dispatch and does support telephone interconnect and is not equipped with satellite voting receivers. (453.675 MHz)
- Channel 9 This channel is licensed, but not currently utilized by AFD. (453.950 MHz)

Within AFD, Battalion Chiefs vehicles are also equipped with VHF radios to communicate with the various Fire Departments throughout the County

The Fire Dispatch Center is equipped with five Motorola CentraCom I radio consoles. Each radio console position is also equipped with 9-1-1 call-taking equipment. There are 2 additional call-taking positions that do not have radio equipment.

AFD also utilizes a Knox Box key system in fire trucks. The purpose of the Knox box is to securely store a passkey used to open various businesses located throughout the City. The passkey is kept under lock and can only be accessed when the lock is opened remotely by a radio tone signal from the Fire Dispatch center. AFD needs to retain this capability in the new radio communication network.

All five positions are equipped with CAD for data entry into the CAD system. AFD utilizes the City's Tiburon/PSW3 CAD system. Three positions are equipped with a backup PC based CAD and status-keeping system. This system drives a wall-mounted map display that indicates the status of fire units in all AFD Fire Stations. This system also drives an alphanumeric paging system, which is utilized for automatic alerting/notification and messaging of AFD support/administrative personnel. This system was built in house.

MDT's are utilized for dispatching emergency response information, unit status, messaging and inquiries, These functions can be utilized either unit to unit or between AFD Dispatch and units in the field.

### ⇒ Problems and Concerns

Inadequate Radio Coverage - One problem that AFD experiences with the current radio system is its inability to provide reliable in-building coverage throughout all of AFD's service area. AFD frequently experiences in-building coverage problems and coverage problems in the greenbelt areas of the City. The Barton Creek greenbelt area located southwest of downtown is an especially poor coverage area.

AFD personnel have also indicated that they would like to have reliable in-building coverage within all high-rise buildings in the City. In addition, they need coverage in the Town Lake, Lake Travis, Lake Austin, and Lakeline Mall areas.

Channel Congestion - AFD personnel indicate that they currently do not have enough Fireground channels to accommodate high-volume periods of activity. Additional Fireground channels are needed in the new system.

Old Equipment - AFD personnel indicate that the majority of their mobile and hand held radios are over 14 years old. This older, outdated equipment requires frequent repair and maintenance, which causes an unacceptable level of downtime.

Lack of Interoperability - AFD is extremely limited in its ability to communicate with other agencies on multi-agency responses. There are no common channels between AFD and APD and only 1 common channel between AFD and EMS.

Since the Fire Dispatch Center shares a common facility at Police Headquarters with Police Dispatch and EMS Dispatch, some of the facility problems that exist for the other departments are also experienced by AFD. Some of those problems include the following:

- Overcrowding,
- No room for expansion,
- · No room to accommodate needed additional equipment,
- Poor or inadequate eating, rest room, break, lighting, ac/ heating, safety, and parking facilities.

#### ⇒ Needs and Wants

AFD needs the following channels or talk-groups for its own dedicated use in the new radio communication system:

- · Seven Fireground
- One standard/routine operations
- One administration
- One or more paging/Zetron station alerting

- One AFR emergency
- · One Fire/EMS Rescue
- · One Fire/EMS Medical
- · One Fire Investigations
- One Fire Prevention
- Two Training
- Two inter-agency

AFD needs to develop a fully functional backup dispatch center that would be capable of supporting Fire dispatch operations for an extended period of time should the primary facility become disabled. The backup dispatch facility could be smaller in scope but should be able to support routine day-to-day operations including fire station alerting. The backup dispatch facility should be able to receive incoming calls for service and should also be interfaced with the City's computer-aided dispatching system to facilitate dispatching, status, and record-keeping functions. A contingency plan should be developed to make an emergency relocation from the Primary Dispatch Center to the Back Up Dispatch Center.

AFD needs to develop an improved fire station alerting system that would allow for faster deployment of AFD resources. The alerting system should provide for simultaneous alerting. The current four Zetron encoders cannot be used simultaneously. The alerting system should also be flexible enough to allow for AFD to divide its service area into multiple dispatch zones as necessary.

AFD needs direct agency-to-agency communication with the Volunteer Fire Departments to coordinate fire fighting activities in mutual aid response situations. AFD also indicated it needs direct radio-to-radio communication for mobile and portable radios with the following agencies:

- 1. City and County EMS
- 2. Austin PD
- 3. County Fire Agencies
- 4. County Sheriff's Office
- 5. Office of Emergency Management
- 6. City of Austin Water Department
- 7. Austin Electric Utility District
- 8. Southern Union Gas Company

Fire Department dispatchers also need to be able to communicate with these agencies directly from their dispatch consoles.

AFD is interested in pursuing Automatic Vehicle Location as a safety issue and as a means of reducing response times. AVL would help incident commanders deploy widely dispersed resources at a major incident. In the event that AVL technology is developed and

implemented within AFD, the AVL system should be interfaced with AFD's computer aided dispatching system to allow for more efficient and appropriate decision making within the CAD system.

Fire Investigations officers need voice encryption ability to transmit tactical or sensitive communication information on an as-needed basis. Fire Investigations communicates directly with the Police Department frequently and this capability would help protect sensitive communication under such circumstances.

# 4.1.3 Austin Emergency Medical Services

### ⇒ Agency Organization and Function

The City of Austin Emergency Medical Services (EMS) Department is a wholly owned and operated Public Safety Department, which was created by City ordinance in 1975. EMS joined the Police and Fire Department, becoming the City's third public safety provider in January of 1976. In 1994-1995, the system's 17 ground ambulances and two emergency helicopters responded to 56,347 calls. In the intervening 20 years, the service has matured into a comprehensive and fully integrated pre-hospital advanced life support delivery system for all of Travis County.

In 1984, Austin EMS was recognized for its excellence when it received the distinguished Leo R. Schwartz EMS System of the Year Award from the National Association of EMTs (NAEMT). The recipient of this award is not eligible to win more than once, but the Texas Association of Emergency Medical Technicians recognized Austin in 1989 as "Advanced Life Support System of the Year". An Austin EMS Senior Paramedic was named both Texas and National Paramedic of the Year for 1989.

The Department has primary EMS responsibility for all emergency medical responses occurring within the approximately 1,100 square miles of Travis County, including the Lake Travis recreational area west of the City of Austin. In addition to traditional ground emergency medical responses, the EMS Paramedics provide medical rescue operations in specialized areas including technical rescue situations, hazardous materials responses, law enforcement tactical operations and others.

In 1985, the Austin EMS department began a unique cooperative venture with Travis County and the City of Austin, whereby Austin EMS offers an emergency medical helicopter transport service for the entire Central Texas area. STAR (Shock Trauma Air Rescue) Flight is staffed with Austin EMS Paramedics and Flight Nurses from the Cityowned Brackenridge Hospital and operates out of two aircraft owned and operated by Travis County. STARFlight is used for immediate on-scene trauma care and rescue capabilities, as well as for hospital transfers.

The EMS department also coordinates ongoing Public Information, CPR Training, First Aid, and DWI Awareness Programs, maintaining a positive public image and widespread community support throughout our service area.

The Austin Emergency Medical Services Department provides all levels of pre-hospital emergency medical rescue and treatment for the citizens of Austin and Travis County, and is currently organized in three divisions as follows:

- Operations Division
  - Field Operations
  - Emergency Communication
  - · Special Operations
  - Research and Planning
- Physical Services Division
  - Financial Services and Billing
  - · Supply Services
  - · Fleet Services
  - Management Information Systems
- Clinical Practice & Training Division
  - · Medical Director's Office
  - Medical Education & Training
  - · Medical Quality Assurance and Standards
  - Video Production and Broadcast

Requests for assistance are received through the Austin/Travis County 911 system or through other public safety agencies. These requests are evaluated by EMS Telecommunication Specialists who dispatch appropriate First Responder agencies and emergency ambulances. To enhance service and maintain fiscal responsibility, the EMS Department has converted the previous multi-tiered response system to an all Advanced Life Support emergency response system. EMS also provides specialized services including response for hazardous materials, mass casualties, physical entrapment, fire and accident scene rehabilitation, and rough terrain rescue. EMS also provides medical support for local law enforcement Special Weapons and Tactics Teams.

Training and Quality Assurance provides the resources and support for field personnel to consistently deliver care that meets patient needs and exceeds state and national standards. This Division also provides a comprehensive infectious disease control process that reduces the risk of exposure for all departmental personnel.

Medical control is established by a Medical Director who supervises an extensive set of standing orders to be utilized by field personnel. Direct radio contact with physicians in area emergency rooms provide a means of obtaining additional orders when necessary.

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Collectively, the EMS department employs approximately 237 personnel; fourteen Commanders manage the 181 field and communication personnel, including Paramedics, Flight Paramedics, Emergency Medical Technician-Intermediates (EMT-Is), 1 Training Captain, and 20 Telecommunications Specialists. These 181 field personnel work a variety of shifts, including 24/48's, as well as more typical 12-hour shifts and others.

The system operates eighteen (18) EMS medical rescue ambulances and three (3) Command units and one helicopter rescue unit (STARFlight) out of eighteen (18) stations distributed across the City of Austin and Travis County. Eighteen (18) of these units, including STARFlight are strategically located throughout the City of Austin, and one (1) is positioned in Travis County. Twelve (12) of these EMS stations are located in joint facilities with the Austin Fire Department, five (5) are housed in "stand-alone" City of Austin EMS facilities, in addition to the one (1) station located in Travis County.

The EMS Department operates a fleet of 30 emergency vehicles. The 24 ground based ambulances are of two (2) types: Six (6) "Type-1" modular units mounted on heavy-duty truck chassis and twenty-four (24) units mounted on larger medium-duty Freightliner chassis. In the current operations configuration, all units are stocked and operated as Advanced Life Support Medical rescue units, staffed by a minimum of one Paramedic and one (1) EMT-I. In addition to the Travis County pilot, STARFlight is staffed by one A.EMS Flight Paramedic and one (1) Flight nurse.

Austin EMS currently runs approximately 60,000 calls annually. Over the past three years, call volume has increased approximately 19%, however, last year, call volume increased 9%. EMS forecasts call volume to continue increasing at the 9% rate for the next five to ten years. Over the past 12 months, EMS responses beyond the City limits accounted for approximately 14% of the calls dispatched.

EMS units are currently dispatched from the EMS Communication Center located at Police Headquarters. The current dispatch facility is approximately 14 years old and is about 1,325 square feet of space, which includes the primary dispatch area, a small supervisory room, and an equipment room.

EMS does not currently have an operational backup dispatch center; however, plans have been undertaken to establish a backup facility at the City of Austin Emergency Operations Center as well as the Capital Area Planning Council.

Incoming calls for EMS service are first answered by the Austin Police Department call-takers, who screen calls to determine appropriate response needed. Once it is determined that an EMS response is required, the call is transferred via a one-button transfer to the EMS Dispatch Center. EMS personnel then determine the type of response required, and according to nationally established protocols, (Medical Priority Dispatch System) which is being incorporated into new 9-1-1 PSAP equipment. EMS Communication staff will request a first response unit from the Austin Fire Department, via an electronic "RA" (request for assistance) in the CAD system, in addition to dispatching the actual medical

rescue ambulance. First response is provided by the City of Austin Fire Department within City limits. Outside the City limits, within Travis County, responsibilities for first response are shared among the 14 volunteer EMS and Fire agencies in Travis County. The Austin Fire Department's first responder medical rescue support services are dispatched from the Department's 35 strategically placed fire stations within the City of Austin.

All of the fire fighters in AFD have been certified by the Texas Department of Health at either the Emergency Medical Technician or the Emergency Care attendant levels, and several have been certified at the Paramedic level.

Once Fire and EMS units arrive at a critical care scene, the EMS unit manages all aspects of patient care from that point forward, including transport to any of the area hospitals. The EMS Department also handles all critical care transfers between medical facilities within the City of Austin, while a private corporation handles all non-emergency transfers within the City.

The current dispatching process occurs as follows:

- A call for service is received by Austin P.D. call-takers
- · EMS calls are immediately transferred to EMS dispatchers
- · EMS dispatchers triage the call according to the MPDS protocols and
- · Enter call information into the CAD system
- The CAD system routes the call to appropriate dispatchers at both Fire and EMS
- · Fire and EMS dispatchers dispatch the appropriate crews by radio

Each EMS crew is equipped with a tone and voice pager and a charger amplifier in their station. Most EMS stations are equipped with a public address system within the station to aid in alerting the crewmembers to incoming emergency calls. When an incoming call for service needs to be dispatched, and the required units are located at the EMS stations; EMS dispatchers encode the pager at the appropriate station. In addition, the City's shared computer aided dispatching system also routes dispatch information to the appropriate CAD printer located at the EMS station. Simultaneously, dispatch information is also transmitted via the mobile data network to MDT units located in the appropriate ambulances. The same process is utilized to dispatch fire units. Paging of AFD units occurs on the Fire Department's FireCOM 5 which operates on a different frequency from EMS Channel 1 (MED 10).

Seven of the 14 volunteer fire departments in Travis County contract with a private service provider for dispatching services. In the event that a call for service falls within one of these jurisdictions, the system automatically alerts American Medical Response/ GOLD CROSS Services via an UHF pager programmed into the EMS ZETRON paging system. Once notified, the private dispatching service notifies the appropriate volunteer fire department utilizing a local commercial alphanumeric paging service.

EMS units routinely transport patients to seven area hospitals, including:

- Seton-Brackenridge
- Seton Medical Center
- Seton Northwest
- · Columbia St. Davids Hospital-
- Columbia St. Davids Hospital
- Austin Diagnostic Medical Center (Columbia)
- Round Rock Community Hospital (Columbia)

### ⇒ Current Systems

The two-way radio equipment within the EMS Department consists of various Motorola and General Electric equipment. The Department currently operates approximately 60 mobile radios in the VHF and UHF bands as well as mobile data terminals in the 800 MHz bands. In addition, the Department operates 80 handheld radios and 30 mobile data terminals. At cut-over to the new system, EMS forecasts they will need 106 mobile radios and 209 portable radios. These mobile and portable radio requests are represented in the attached table. The EMS department anticipates that these numbers would grow at approximately 3% per year, resulting in a ten-year growth to approximately 142 mobiles and 281 portables.

The Dispatch Center is currently equipped with three Motorola CentraCom I dispatch consoles and three additional call-taker positions. Dispatch positions are also equipped to take incoming calls for service. The CentraCom I consoles have been manufacturer discontinued for over twelve years. The existing console system includes channel modules for operation on the following frequencies:

- VHF Dispatch
- UHF Channel 10
- UHF Channel 9
- Travis County EMS Dispatch
- Intercity Mobile
- VHF Hospital Channel
- FireCOM 3
- FireCOM 5
- APD Administration
- EMS Med Channel Voter Control

Block diagrams of UHF Channels 9 and 10 are shown in Exhibits 3-16 and 3-17 at the end of this section.

Austin EMS does not send telemetry to the area hospitals utilizing the UHF radio network. They are in the process of switching to Life Pack 11 products, which include 12 lead EKG units with cellular telephone compatibility. Two local hospitals are currently equipped with the receiving equipment compatible with the Life Pack 11 system.

EMS currently shares the City's Public Safety Computer Aided Dispatching (CAD) system, which operates on a City-owned IBM 3090 series mainframe. The CAD software was provided by Tiburon/PSW3. The EMS Department currently operates approximately 40 user terminals and 25 printers off of the CAD system. The system also has interfaces with the 9-1-1 system, ANI/ALI system, and the EMS Department's ZETRON paging encoder. Dispatch personnel indicate that the CAD system is heavily loaded and frequently provides insufficient response time.

#### ⇒ Problems & Concerns

The EMS Department identified a number of operational concerns with their current system environment. Problems identified include the following:

Channel Congestion - EMS currently experiences conflicts between emergency dispatch paging and routine and emergency voice radio traffic. Radio paging on the dispatch channel causes both dispatchers and field units to lose parts of communication due to overriding pages. In addition, dispatch traffic levels on the single dispatch channel are so high during peak periods of activities that transmissions become confused and are missed entirely.

Inadequate Radio Coverage - EMS personnel indicated that their single largest communication problem is a lack of adequate radio coverage with mobile and portable radios. Severe problems occur near the lake, river, bluffs, and hill country. Reliable inbuilding communication with handheld radios is needed in the following areas:

- City Jail
- County Jail
- All area hospitals
- Downtown buildings
- UT Erwin Center
- · Motorola site
- All large malls
- Old Airport
- City Hall
- Palmer Auditorium

- EMS Station No. 10
- IBM (Burnet Road)
- University of Texas buildings
- Emergency Operations
  Center
- New Airport building
- State Capitol Complex
- LBJ Building
- DPS Building

Improvements in radio coverage are also needed in the following area:

- Northwest 183 quarter
- Lake Travis area
- Lago Vista and Jonestown
- Greenbelt area
- Hamilton Pool Road
- Lake Austin Shorelines
- Camp Ben McCullough Road

Channel Interference - EMS currently experiences interference from several different sources. Interference is received on the VHF channel 155.325 MHz from Conroe EMS and Baptist Memorial Hospital in San Antonio. In addition, the Department receives interference from Williamson County EMS operating on 462.975 MHz. Interference from Williamson County is so significant, Austin EMS is investigating the possibility of relocating its dispatch operations to MED 9 (462.950 MHz) or another MED channel.

Outdated Equipment - Most of the EMS Department's handheld radios are typically five to seven years old. Mobile radios are typically ten years old or older. The older radios are becoming increasingly more difficult to service and less reliable in field operations. In some cases, spare parts or replacement accessories are no longer available. Recent replacements have improved this situation significantly, but greater need for equipment results in older equipment remaining in service beyond its reasonable public safety lifetime.

Dispatch consoles located in the EMS Dispatch Center were manufacturer discontinued over ten years ago and are in need of replacement. Spare parts for these consoles are no longer available in many cases. In addition, expansion or reconfiguration of the console equipment is not possible.

Frequent Equipment Failure - EMS indicated that due to the increasing age of their radios, they typically have three to five radios down for service at any point in time. In addition, during peak hours, they experience regular slow downs in the mobile data system throughput that appears to result from an overload of mobile data traffic being handled by the current data system.

In the EMS Dispatch Center, the ZETRON paging encoder which is interfaced to the CAD system has recently been replaced, but has no back-up system in the event of failure.

Inadequate Backup Facilities - The EMS currently does not have a fully operational backup dispatch center that could be placed into operation in the event that the primary center was disabled. EMS has coordinated with the staff of the Office of Emergency Management to utilize positions there in the event of a primary center failure. The City of Austin EOC has several CAD workstations and some limited radio communications

capability that could be utilized on an emergency basis, however, it would not be suitable for a long-term backup dispatching purposes. In addition, EMS maintains an agreement with Travis County for the use of their mobile emergency unit that could be utilized to help support dispatching in the event that the EMS dispatch center became disabled. The mobile communications center, however, does not have the ability to receive incoming 9-1-1 calls for service or access to the City's computer aided dispatching system. EMS is continuing to work on the development of one or more functional backup centers, including the training PSAP at CAPCO. In general, it is expected that EMS and AFD would prefer to relocate together in the event the primary dispatch center became unusable. The development of such a backup center is a high priority in future plans as they relate to the construction of a regional communications center.

EMS does operate backup repeaters at PD Headquarters; however, radio coverage provided by this site is considerably less than coverage provided by the Mount Larson facility.

Inadequate Inter-agency Radio Communications - EMS needs much improved interagency communications over the current system. At the present time, they are unable to communicate by radio directly with Austin P.D. or Austin Fire Department. They are currently working on implementation of a shared UHF channel to communicate with the Fire Department on EMS medical calls.

Radio communications with Travis County Law Enforcement agencies are limited to intercity mobile communications. To communicate with County EMS units, Austin EMS units share a VHF repeater on the West side of Travis County. The repeater provides poor coverage on the East side of Austin and makes inter-operability difficult at times. Because Austin EMS operates in the UHF band and Travis County operates in the VHF band, two different radios are required in each unit of the EMS fleet. EMS personnel do not currently have the ability to communicate directly with County fire departments. They also do not have the ability to communicate with any City or County service departments.

Since the EMS Communication Center is located at Police Headquarters with Police and Fire dispatch centers, it shares some of the same operational problems experienced by the other agencies, including:

### Internal/Environmental Issues

- Lack of adequate operations space
- · Poor climate control
- · Poor air quality
- Limited access security
- Lack of operational backup facilities
- No administrative space available
- Lack of emergency lighting

- · Poor primary lighting
- Lack of an adequate number of rest rooms, showers, break facility, lockers, food stores, and rest areas to accommodate extended operations
- · No training space available
- · No joint command and control facility

#### External/Environmental Issues

- P.D. Headquarters is located in a flood zone of Waller Creek
- Building is located adjacent to Interstate 35, a hazardous materials route through the City
- · Potentially volatile location in the Austin P.D. building
- · Inadequate parking for staff
- · Proximity to fixed chemical sites including fuel storage and maintenance facility
- Incoming phone lines are routed into the facility in a single cable, no alternate
  routing for cable entry into the building is currently provided. In the event that the
  primary telephone cable was damaged or cut, all incoming telephone service to
  Police Headquarters, including 9-1-1 calls would most likely be disrupted.

EMS currently utilizes only four of the ten UHF Med channels for their two-way radio voice communications but is working with other agencies to develop a regional plan for the more complete and coordinated utilization of all ten frequencies. EMS currently operates a repeater for MED Channel 10, which is located at the City's Mt. Larson tower site. This channel is equipped with satellite receivers strategically located throughout the City, and provides the best overall communications for EMS. In addition, EMS also operates MED Channel 9 at the same location, which is equipped with satellite receiver capability as well. All ambulances are currently equipped with both UHF and VHF mobile radios. The VHF radios are used to communicate with Emergency Rooms and Travis COUNTY EMS units. The VHF radios are equipped with the following channels:

- Travis County EMS Frequency
- Hospitals
- Intercity
- Old Austin EMS VHF Channel

Under the present system, a single dispatcher manages all radio communications with all EMS units. The call volume load has become too high for a single dispatcher to successfully handle peak load situations. EMS is planing to divide the City of Austin into two dispatch zones. They are currently working with Travis County to add an additional

repeater that will facilitate the creation of two dispatch areas. In the event that the City develops an 800 MHz trunked radio system, EMS will need a minimum of two dispatch talkgroups to manage current emergency demand as well as a dedicated talkgroup for managing new services being planned for the immediate future. The Austin Fire and EMS Departments have recently reassigned one of the existing channels, FireCOM 3 to be a shared channel for both Fire and EMS to utilize in joint responses. The shared channel would provide for better coordination between units responding to emergency scenes. They are currently exploring the possibility of expanding this to include a second joint channel dedicated to joint/ multi-agency rescue responses.

### ⇒ Needs and Wants

The EMS Department needs direct radio-to-radio communications with the following agencies:

- Austin Police Department
- Austin Fire Department
- Travis County Sheriff's Office
- County EMS
- Williamson County EMS
- All Austin Hospitals
- · Williamson County Hospitals
- West Lake Police Department
- Rollingwood Police
- Manor Police
- Pflugerville Police
- Department of Public Safety
- AISD Police
- Capital Metro
- Hospital Police
- Airport Police
- Aviation Police

- City Manager's Office/EMO
- · Travis County Parks
- Travis County ENR Department
- Travis County Constables
- Travis County Emergency Mgmt.
- Travis County Lake Patrol Boats
- Austin Public Works
- Electric Utility District
- Austin Water
- Austin Sanitation
- Austin Emergency Management
- STAR Flight
- Elgin EMS
- Bastrop EMS
- Haves County EMS
- Gold Cross Transfer Service
- Mall Security

In planning for the new communications system, EMS has a need for the following communications channels or talkgroups:

- Primary Dispatching/Paging
- Priority Communication North
- Priority Communication South
- General Communications
- Tactical A (Citywide)
- Tactical B (Citywide)

- Disaster Planning
- Administrative
- Command
- Training
- Supply
- · Primary Care Service

- Two Second Tier Services
- Public Safety Joint Operations
- Tactical (Talkaround A)
- Tactical (Talkaround B)
- Tactical (Talkaround C)
- Tactical (Talkaround D)
- EMS/Law Tactical
- Incident Command

- Public Information Officers/ Media
- County EMS West Side
- County EMS East Side
- EMS/Fire Rescue
- EMS/Fire Medical
- Special Events
- Other Public Safety
- City Manager

Key among the needs of the Austin EMS department as we implement a new voice radio communications system will be to develop a solution to their emergency alerting systems for both fixed locations (stations) and personnel in the field. EMS currently used a EMS MED Channel 10 (462.975) for single site tone and voice alerting from the Mount Larson tower location. It is anticipated that as the department transitions to a trunked radio system, this solution will include proposed solutions for both station and personnel alerting. Station alerting should provide the ability to deliver voice dispatch information to multiple units simultaneously in different areas of the service area utilizing existing fiber optic as well as RF transmission solutions. In addition, personnel alerting should provide the ability to deliver emergency call information to crewmembers in the field throughout the service area with the same coverage parameters as outlined for the trunked radio system. These requirements are more completely spelled out under "Paging and Alerting Systems" in Section 3.

# 4.1.4 Aviation Department

# ⇒ Agency Organization and Function

The Director of Aviation manages the City of Austin's Department of Aviation. The Director reports to an Assistant City Manager. Within the Department of Aviation there are five primary Divisions. They are:

- Public Safety/ (Police & Fire)
- Operations & Maintenance
- Finance
- Economic Development
- New Airport Project Team

The new Austin-Bergstrom International Airport is under construction and expected to be completed in April of 1999. At this time, construction is on schedule.

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Historically, airport radio usage has grown 5% - 7% per year. This has been true for the last ten years. Based on this call volume increase, it is realistic to anticipate that an additional dispatch position within the Public Safety/Police Division will be necessary within the next ten years. In addition, there are new duties that are expected to be performed by the same dispatchers at the new airport. These include paging operations for the new airport terminal building and operating the main telephone switchboard facility

Within the Aviation Public Safety/Police Division, there are currently thirty-three (33) sworn police officers. In addition, twelve (12) civilian support staff are employed in communications and security/identification areas. As part of the twelve (12), there are currently eight (8) full-time dispatchers, in addition to a dispatch supervisor. There are two (2) dispatch console positions at the current airport terminal facility. These are equipped with identical radio control capabilities. Three positions are being planned for at the new airport. Currently, there are typically two dispatchers on duty between 5:30 a.m. and 12:30 a.m. Between 12:30 a.m. and 5:30 a.m. there is typically one dispatcher on duty. These dispatchers can communicate directly via radio with the Austin Police Department (APD) on APD's "Charlie" channel. In addition, two aircraft / air traffic control tower frequencies are monitored. Police officers use these air traffic frequencies to request clearance from the tower when they need to drive onto active runways & taxiways of the airport.

When a 9-1-1 call is received at APD, which requires response by Department of Aviation staff, the APD call-taker enters the complaint information into the shared CAD system and forwards same electronically to the Airport Dispatch Center. The CAD terminal at the Airport Public Safety/Police dispatch position then receives the complainant information and assigns the call appropriately. If the call is for information purposes only, the 9-1-1 call-taker may simply transfer the caller directly to the Airport Dispatch Center via telephone. When the call is transferred from APD 9-1-1 to the Airport Dispatch Center via CAD, there is currently no ANI/ALI data transfer. At the new airport, it is anticipated that the Airport Dispatch Center will become a primary PSAP with full ANI/ALI capabilities.

In addition to the Aviation Public Safety - Police Division, there are other groups within the Department of Aviation which are radio users. Operations and Maintenance will double in size (manpower) and will be re-organized into three (3) divisions, Airside Operations, Landside Operations and Building Maintenance. Currently the O&M Division has approximately 35-40 radios, all except three are portable units. It is anticipated that this group will require approximately sixteen (16) mobile units and seventy-eight (78) portable units at the time the new system is activated. This number also includes seven (7) portable radios to be used by the Office of the Director and the Engineering Division. Within the Department of Aviation, the Finance and Economic Development Divisions are not radio users. The New Airport Project Team will become the Department of Aviation's Engineering Division at the time that the new airport becomes operational.

## ⇒ Current Systems

Three Aviation Police vehicles are equipped with MDT's that are on the same transmit/receive system as that of the Austin Police Department (APD).

Aviation Police currently have fifteen (15) Motorola SABER portables for daily use. They also have seventeen (17) Motorola MX type portables in storage. These could be used, but are not currently equipped with the frequencies that Aviation has since acquired. With the anticipated new trunked system, Aviation Police are planning for assigned/dedicated radios for forty-three (43) officers with seven (7) additional spares,,,for a total of fifty (50) portables. Mobile radio requirements for the Police Division may require ten (10) units at the new airport, in addition to approximately five (5) additional MDT's.

In addition to radio, the dispatch console includes security access controls. One dispatcher has two PCs for this purpose, with two keyboards and two CRTs that sit on the desk. This position also has CCTV monitors for security purposes.

Also located in the Airport Dispatch Center facility are two TCIC/NCIC terminals. There are also two terminals in the investigator's offices and one in the report writing area. At this time, the teletype printer is located behind the dispatcher which creates a noise problem. This will be moved further from the dispatcher in the new facility. At this time, there is equipment in the dispatch facility for the paging system. A larger paging system is planned for the new airport. Dispatchers at the new airport center will also monitor both the fire alarm and the building energy management system.

There are currently three frequencies used by the Public Safety/Police Division. Channel lis their high power repeater channel. Channels 2 and 3 are low power splinter channel repeater frequencies. The dispatch positions are equipped with APD's "Charlie" Sector frequency, which is their only radio link to APD at this time.

The Aviation Police dispatch facility is also equipped with a Meridian telephone system. Telephones are wall mounted to the console panel. They are also equipped with a special telephone line at dispatch and at the Department of Aviation's reception area. These lines are set up to allow the user to enter one phone number and ring a long series of telephones to make a group call by telephone. This is used to place bulletin information out to media or to emergency operations, etc.

The Operations and Maintenance Division radio frequency is also located in the Airport Dispatch Center's console. This is the only frequency and channel used by the O&M Division, the Office of the Director and Engineering. The O&M Division has remote dispatch capabilities in two areas, the Department of Aviation's 2<sup>nd</sup> floor reception area and the Building Maintenance's Control Center, both staffed from 8:00 a.m. - 5 p.m.,

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Monday - Friday only. Equipment includes a hand microphone at the receptionist desk and a desktop telephone type transceiver at the Maintenance Control Center.

#### ⇒ Problems & Concerns

At this time the Aviation Dispatch Center does not have instant recall recorders. One of these units will need to be included for each dispatch position in the new facility. They are equipped with a digital Dictaphone logging recorder.

At this point in time, significant RFI problems have been witnessed. Sources of these RFI problems include airlines, ground crews, etc.

Another concern is the inadequate ability to communicate between Aviation and various City public safety agencies, most notably Fire and EMS. The Aviation Dispatch Center has limited ability to communicate with the Austin Fire Department's Aircraft Rescue – Fire Fighting (ARFF) units stationed at the airport. ARFF receives notification of an aircraft emergency incident from the Air Traffic Control Tower via a dedicated "hot-line" telephone ring-down system. This line is also monitored by AFD's Dispatch Center, in addition to Aviation Dispatch Center and various other points at the airport.

While channel congestion is not a significant problem, coverage has been identified as a significant concern. Operations at the current airport on the old channels are not adequate. The low-watt splinter channels do not provide communications for units travelling for much distance outside the airport. There is limited communication between the two airports and communication is sometimes weak inside the current terminal building. Portables on airfield perimeter roads experience some weak/dead spots.

The Operations and Maintenance channel frequency can get very busy during normal daily operations. During emergencies, those not involved in the emergency are required to maintain radio silence. The O&M division will be re-organized into three (3) divisions at the new airport,,,Airside Operations, Landside Operations and Building Maintenance Divisions. Each new Division should have it's own separate talk-group. An airport emergency talk-group should also be planned for. No matter the emergency, the usable part of the airport will remain operational and require the normal ability to communicate.

#### ⇒ Needs and Wants

The current terminal building is approximately 120,000 square feet. The new facility will be more than double that at about 500,000 square feet. The new airport will include 4,000 acres, many new buildings, and large parking garage structures. All of these facilities must be covered reliably with the new radio system.

Although congestion is not serious for police operations at the Airport, the Operations and Maintenance channel can get busy in the daytime. This operation should at least be split into three separate channels, one each for airfield operations, non-airfield and building maintenance operations.

In addition, a coordination channel would also be useful. Mutual aid is of significant concern particularly with ARFF, other AFD units, EMS, and STAR Flight. Communication is also strongly desired with other law enforcement agencies such as The Texas Department of Public Safety, the Travis County Sheriff's Department, the Austin Police Department, etc.

With the new Austin-Bergstrom International Airport under construction adjacent to the Travis County Sheriff's Department Del Valle Correctional Facility, it would be useful if Aviation Public Safety/Police Division personnel could communicate with that facility in the event of an incident which would require mutual assistance. As an example, Del Valle prison escapes are a significant security and safety risk to the new airport. However currently, Airport Police are only aware of such an event if the Correctional Facility actually calls by telephone the Airport Dispatch Center.

#### 4.1.5 Convention Center

# ⇒ Agency Organization and Function

The Austin Convention Center Department operates and manages the Palmer Auditorium, City Coliseum, and the Convention Center. Additionally, the Department manages private vendor service contracts, one being with Audio-Visual Service (AVW) and the other for a concession operation (Fine Host).

It is anticipated that the convention Center may add 100,000 square feet of exhibit space within the next five years. Fine Host, while principally involved with catering on-site conventions, also participates in off-premise private engagements. Likewise, AVW has performed production work on assignments throughout the metropolitan Austin area.

# ⇒ Current Systems

The Department currently operates six UHF repeater systems. The primary channel, F1 is a high-powered (100-watt) system located at Palmer Auditorium. This system is shared by all Department users to provide off-premise coverage as well as communications supportive of the Coliseum, itself.

The remaining channels (F2 - F6) are 2-watt splinter systems located at the Convention Center Facility. Channel assignments are as follows:

- · F2 -Event Staff
- F2 & F3 Maintenance
- F4 Fine Host
- F5 AVW Staff
- F6 Security

Control stations are located as follows:

- Palmer/City Coliseum
  - Administration Office
  - Operations Office
- Convention Center
  - Administration Office
  - Security Control
  - Fine Host Office

Additionally, the F1 repeater is equipped with an automatic telephone interconnect system.

#### ⇒ Problems & Concerns

Currently all users are experiencing severe channel congestion. All of the splinter channels receive interference from high-powered adjacent channel systems to such an extent that their effectiveness is limited.

Most of the equipment is 3 1/2 years old, although Palmer Auditorium's ten radios and repeaters are in excess of 12 years old, is expensive to maintain and is prone to frequent failure.

#### ⇒ Needs and Wants

In addition to requiring improved on-site coverage and call privacy, some users (Fine Host and AVW) desire coverage throughout the city. AVW has a need for more "channels" to support even-related communications. Convention clients often require off-site radio communication, which AVW cannot provide with their existing system. It is estimated that 16 channels will be needed.

As multiple events are normally held at the City facilities, interference between event-users is excessive

It is envisioned that radio system resources would be utilized, daily, by the Convention Center Department. Normal periods of operation are from 6:00 A.M. to midnight.

Equipment requirements are as follows:

# 4.1.6 Austin Energy

## ⇒ Agency Organization and Function

Austin Energy provides electrical generation and distribution services throughout the City of Austin and portions of Travis and Williamson Counties. The present service area is 425 square miles with approximately 300,000 customers.

The Department operates two conventional generation facilities in Austin and has a 16% ownership in South Texas Nuclear Power Plant, and 50% ownership in two units of Fayette Power Plant, and 50% ownership in two units of Fayette Power Plant.

Austin Energy operates two service districts: North and South. The North Service Center is responsible for transmission, substation operation, metering and engineering. The South Service Center is concerned with overhead distributions, the Downtown Austin Network, engineering/construction, overhead and underground engineering construction and services.

### ⇒ Current Systems

Austin Energy's radio communication system is principally UHF contains seven wide-area repeater systems and five low-powered 12.5 KHz offset plant-site repeaters. The wide-area systems include remote receiver/voter selectors to provide enhanced portable radio coverage throughout the normal service area.

The offset-channel repeaters are located at the Holly (3 channels) and Decker (2 channels) generation plant sites. Austin Energy hopes to retain these channels in addition to retaining one of the wide-area system channels, although this has not been formally approved. These offset channels have existing in-building antenna systems that could easily be converted for any frequency usage.

Utility Customer Service uses older VHF equipment.

# Operating frequencies are as follows:

DESIGNATOR	FREQUENCY	USE
Channel 1	451/456.025	Primary Dispatch
Channel 2	451/456.250	Power Plants/Backup Dispatch
Channel 3	451/456.175	Overhead Construction
Channel 4	451/456.375	Substation & underground Construction
Channel 5	451/456.425	Meter and street light
Channel 6	451/456.075	System control, maintenance, stores
Channel 7	451/456.125	Holman Substation near LaGrange

NOTE: Channels 1 - 6 have satellite receivers located at the Decker Plant, Williamson Substation, and High Cross Substation, Southyard, Seaholm Power Plant, and private towers at Highway 360 & Bee Cave Road.

NOTE: Channel 7 is a standalone repeater, dispatch accesses it by using a control station.

# Operating frequencies continued:

DESIGNATOR	FREQUENCY	USE
HP - 1	451/456.2125	Holly Plant Operations
HP - 2	451/456.4625	Holly Plant Operations
HP - 3	451/456.2875	Holly Plant Operations
DP - 1	451/456.5125	Decker Plant Operations
DP - 2	451/456.6875	Decker Plant Operations
Wire	153.575	Wire Pulling Units
Load	153.530	Load Management
Utility Customer Service	158.250/153.665	Meter Service Operations

Primary radio dispatching is available at both Service Centers as well as the Control Center, ECC.

The location of dispatch control points are as follows:

- ECC 301 West Avenue
- North Center 2412 Kramer Lane
- South Center 4411 Meinardis Road
- Utility Customer Service Main Dispatch 721 Barton Springs Road
- Utility Customer Service Meter Services 701 W. 5th Street

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Austin Energy will require computer based radio control consoles at each of the above sites. These will be connected back to the control equipment on Austin Energy's and GATTN fiberoptic networks.

Austin Energy presently operates 455 mobile units, 395 portable units, 17 control stations, 515 digital pagers and 280 cellular telephones. A 2% to 5% future increase in system users is anticipated annually.

98% of all radio transmission, during normal situations, occur between the hours of 6 AM - 4 PM. The remaining 2% are principally between the hours of 3:30 PM - 12 AM (midnight). During storms or during periods of abnormal system operation(s), traffic patterns and channel loading would increase (up to 75% of total available units) in relation to the circumstances of that event.

#### ⇒ Problems & Concerns

Austin Energy reports that their present systems are experiencing channel congestion, interference and inadequate coverage. The main dispatch channel is shared with North, South and ECC. Consequently, dispatch calls are often queued due to the high traffic volume.

Co-channel interference has been experienced on most channels. A spurious mix often occurs on Channel 3, keeping it keyed for extensive periods of time. Poor coverage has been reported outside the Austin City limits, toward the West. The western portion of Travis County is extremely hilly and problematic for most City radio users. Coverage within the City is, however, adequate.

Austin Energy also maintains power lines from Austin to the South Texas Nuclear Power Plant at Matagorda. They currently have their Channel 7 repeater in LaGrange, but it does not cover the entire length of the power line. They desire to find a solution to communications problems along this line which parallels State Highway 71. This may be able to be done through private systems or LCRA's radio or fiberoptic/microwave network.

Austin Energy reports that it has not formally committed to participating in this shared network. The Lower Colorado River Authority (LCRA) is constructing a wide area 900 MHz trunked radio network incorporating voice, data, load management and other digital technologies. The Utility is presently looking at the LCRA network as the system's functionality and coverage closely parallels Department needs.

#### ⇒ Needs and Wants

Austin Energy has expressed a need for the following enhanced service features:

- · Telephone interconnect
- Mobile Data Terminals (MDTs)
- Automatic Vehicle Location (AVL)
- Unit identification
- Individual unit calling
- Emergency call button
- Wide-area portable unit coverage
- Direct interoperability with LCRA
- Dual mode (trunked/conventional) radios
- Intrinsically safe radio/battery combinations

Austin Energy desires interoperability with Public Safety providers (Police, Fire, EMS), the Office of Emergency Preparedness, The City Wrecker Service and the LCRA.

# 4.1.7 City of Austin Office of Emergency Management;

Travis County Emergency Management; Austin / Travis County Emergency Operations Center

### ⇒ Agency Organization and Function

The Travis County Judge is the executive manager of the County. By State law, the top executive, in this case the County Judge, is the County's Emergency Management Director. Reporting to the County Judge and the County Commissioners Court is the Department of Emergency Services. Within Emergency Services is the Emergency Management Division, headed by the Emergency Management Coordinator. Its offices are in the County Executive Offices at the Courthouse Complex (411 W. 13th Street, Suite 806).

The City of Austin's top executive is the Mayor, who serves as the City's Emergency Management Director. The Office of Emergency Management is a section in the Austin Fire Department and reports to the Fire Chief. Its office is in City Hall at 124 West 8th Street.

The County and City organized a joint Emergency Operations Center in City Hall approximately 3 years ago. It runs small situations about 20 times per year. Larger activations with 20 or more people occur two to three times per year. The EOC is also used occasionally for planned special events, such as the Fourth of July fireworks hotline. Flooding caused a large scale event in 1991. The Williamson County (Jarrell) and Travis

County tornadoes in the spring of 1997 caused an activation of more than 50 persons working over a multi-day period.

The joint EOC serves an area of 1012 square miles, which includes all City and County incorporated and unincorporated areas. Outside of Austin, there are 13 incorporated cities and 14 fire departments in the current system.

The City Emergency Management personnel do not use radio on a day-by-day basis and own no portable radios. To allow up-to-date information to be processed by the EOC, the EOC uses radios on the appropriate public safety agency frequencies. These radios are connected to antennas already in place at the EOC and are switched onto the needed frequencies.

Various agencies have mobile communications vans, including the volunteer Travis County Communications Squad motor home. This unit is now part of the Travis County Sheriffs Department

Travis County owns two mobile and two portable radios. Mobiles are 40 watt Midland VHF units. The portables are 5 watt Yeasu dual-band handhelds.

The Media is currently notified via an Emergency Conference Network ringdown telephone system. The Austin Warning and Communications System (AWACS) also provides emergency notification to City and Media pagers with alphanumeric messages generated automatically from the CAD system. High priority messages can also be sent as a page to key people and groups.

The EOC has CAD terminals on the City's system, for police, fire, and EMS. It is also equipped as an emergency backup answering point for 9-1-1.

#### ⇒ Problems and Concerns

- Interoperability among all agencies is currently lacking and sorely needed.
- Radio coverage has dead spots in the northwest, southwest, and northeast county areas.
- There are no back-up facilities for the EOC except for the few communications vans owned by various agencies.

#### ⇒ Needs and Wants

Emergency Management desires the system to have 50 to 100 portable radios for special events. Extra batteries, gang chargers, and a programming computer should be located in the EOC and the command vehicles.

800/900-MHz radios will be needed in the EOC after the new system is installed. These will be control stations. It is desired that the various control stations to be used in the EOC be able to be moved to different locations. Locations depend on the type of emergency and how the EOC is staffed. New antennas and transmission line will be needed.

Emergency Management desires a new, large mobile EOC with communications capabilities, perhaps as part of the 800/900 MHz radio project. When talkgroups are engineered, City and County Emergency Management personnel want to be involved to help establish city-wide, county-wide, and command groups, allowing all to fit into the Incident Command System.

Emergency operations require some use of encryption, especially between the EOC, dispatch, Emergency Management staff, and the command staff of all agencies.

Standardized Channelization is also needed in all radios so that any city/county employee can pick up a radio and know approximately how to use it. For example, Channel 1 should be Dispatch, and the last channel should be Citywide Common. Emergency Management would also like to see the use of standardized, plain English language, so agencies can talk with other agencies and understand the other's messages.

Emergency Management desires some Mobile Cross Band Repeaters, tying together a selectable talkgroup with a selectable UHF and VHF radio channel. This would allow out-of-area units to participate in the emergency operations and local units to communicate when out of the area. Some VHF and UHF radios must be maintained for communications with non-800/900 MHz counties and agencies.

The 800/900-MHz radio system must provide the "Emergency Notifications" by giving Media organizations a portable radio and a control station and allowing conversations with PIOs. The area-wide conference networks (ringdown to City/County facilities, hospitals, media, industry) could be replaced by the 800/900 MHz system. There are currently approximately 40 extensions on this system.

A back-up radio system separate from the trunked system is desired to provide communications between 9-1-1 and radio dispatchers, the EOC, and the Radio Shop. This could be a conventional 800/900-MHz system at different sites than the trunked system.

If the EOC moves to the new City Hall or Communications Center, the radio operation must be re-planned to accommodate the facility

### 4.1.8 Health and Human Services

## ⇒ Agency Organization and Function

Health and Human Services is composed of the following divisions:

- Animal Control
- · Public Health
- Primary Care
- Medical Assistance Program
- Neighborhood Services
- Community Care
- Administrative Services (including Receiving and & Distribution)

# ⇒ Current Systems

There are two radio systems. Environmental Health uses an 800-MHz SMR Trunked radio system. SMRs are commercial repeater systems that share the repeaters with many business users, each leasing air time based on number of mobiles or other formulation. Environmental Health uses 29 radios and one talkgroup. Two dissimilar groups (Inspection Group and Litter Abatement officers) use the same talkgroup. But the one talkgroup works well and would need expanding if more people use the system. The system is extremely private and covers well in the City.

Animal Control, Animal Shelter, and Receiving & Distribution use the other system. The former two agencies pick up stray or injured animals and investigate animal cruelty. Receiving is the warehouse group within Administration. This radio system uses a repeater on Mt. Bonnell. There are four control stations (base radios at offices that transmit to the repeater). Dispatchers are available from 6 am to 7 pm for Animal Control.

Since Animal Control must coordinate its work with other agencies, each van or truck has three radios in it. APD and TCSO are among these other agencies.

#### ⇒ Problems & Concerns

### For Environmental Health:

- Coverage problems are limited to the outlying county areas.
- Since 800-MHz is used, other agencies cannot be contacted with the same radio.
   Litter Abatement has three separate radios to facilitate interagency coordination.

- Occasionally the system is "busy" and a couple of second delay results before a channel can be accessed. No long delays are experienced.
- The office dispatches with a handheld radio.

### For Animal Control and Animal Shelter:

- · There are numerous dead spots in and out of the City
- Animal Shelter's Radios are old (10-15 years old) and need "lots of repairs" (and sometimes cannot be fixed). Animal Control has one old radio and Receiving has all old handhelds (some handhelds work so poorly that the user does not hear others on it and transmits over and interferes with others on the channel). Parts for some radios are no longer available.
- The channel is frequently congested and users cannot get through. Talkaround is
  used for short distance communications. Travis County Animal Control also uses
  the radio channel when it is not using the TCSO channels.
- There are no back-up facilities available
- Intercommunications with other agencies requires multiple radios in the vehicles.

#### ⇒ Needs and Wants

Talkaround is very useful and is highly desired for the future system.

### 4.1.9 Information Systems Office

The Information Systems Office is responsible of providing technology solutions, leadership, and support for all City of Austin departments and entities. This responsibility encompasses the engineering, implementation, and maintainance of the applications, systems, and networks which enhance City employees ability to perform their varied duties. The Information Systems Office provides technical support on many software and hardware issues.

The Information Systems Office provides training on many types of computer applications. This training is offered through Instructor Led classes as well as through Computer Based Training (CBT's). The Information Systems Office provides technologically sound solutions to ourcustomers based upon business needs, direction, and technology trends. This responsibility involves analysis of needs, research of solutions, planning and testing for implementation, implementation, and post-implementation testing.

## 4.1.10 Library

## ⇒ Agency Organization and Function

The City of Austin has 21 libraries situated throughout the greater Austin area and operates a total of 24 building facilities.

### ⇒ Current Systems

The Department currently uses 33 alphanumeric pagers, 15 numeric pagers, 11 cellular telephones, and 10 portable radios used by Security and Maintenance Department. All of these radios are on a single channel. The Department currently operates 10 portable radios on this single channel.

### ⇒ Problems & Concerns

Eight of the ten radios are over 8 years old. The frequency, according to the radio questionnaire, appears to be shared by other agencies. The channel provides inadequate coverage inside the John Henry Faulk Library building at 800 Guadalupe Street. Security radios frequently pick up static inside the Faulk Library Building.

#### ⇒ Needs and Wants

In the planned new radio system, the Library would like to have the following talk groups:

- Security
- Maintenance
- Delivery Services

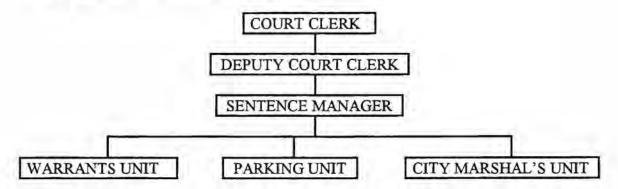
While the Department currently operates two vans, two pickups, a maintenance truck, seven automobiles, and four delivery vans, they would prefer to continue to use handheld radios. Since most of the vehicles are "hand-me-down" vehicles and three automobiles are employee personal cars, they do not plan on installing any fixed mobile radios.

Since radio system requirements are not anticipated to dramatically change by the time of system cut-over, it is anticipated that the Library will need nineteen new 800 MHz trunked portable radios, programmed with the three previously described talkgroups, in the new citywide radio system.

## 4.1.11 Municipal Court and City Marshals

## ⇒ Agency Organization and Function

The Municipal Courts is structured as follows:



There are 17 City Marshals. They are sworn officers with at least 2 years of prior law enforcement experience. They serve warrants, boot cars, provide courtroom security, serve subpoenas, and can make traffic stops and issue other law violation citations.

## ⇒ Current Systems

Marshals may serve warrants anywhere in Travis County or surrounding counties. They maintain radio communications with the APD area they are working in, or they notify APD when they leave its jurisdiction. They try to notify the jurisdiction (other city or county) when they must serve a warrant outside of Austin.

The Warrant Unit provides confirmation of warrant hits. They must confirm that the warrant in paper form is physically available. Requests come via voice radio or MDT to APD dispatch, then by CAD to the Warrants Unit. Confirmation goes by the same route.

#### ⇒ Problems & Concerns

- The Marshals do not have all APD radio channels nor the Parking Enforcement channel.
- The parking ticket and boot procedures are not automated and require many steps of confirmation.
- Radio coverage is poor outside of the City. There are dead spots in the City.
   Radio coverage inside buildings is also poor.

- Other Police Departments are not available by radio due to equipment or frequency limitations.
- The APD channels are quite busy and it is difficult to access the channel.
- Parking radio enforcement coverage is poor.

#### ⇒ Needs and Wants

Coverage should be county-wide or greater.

## 4.1.12 Parks and Recreation Department

## ⇒ Agency Organization and Function

Parks and Recreation Department (PARD) is composed of the following divisions: Operations; Senior Transportation; Police; Athletics; Golf; Facilities Construction; Aquatics; Nature Programs; Recreation Center; and Cultural Arts.

### ⇒ Current Systems

PARD uses two UHF channels for most operations. Channel 1 (453.325-MHz base transmit & 458.325-MHz receive) is the Primary Channel, and Channel 2 (453.575T & 458.575R) is the Secondary Channel. These channels have repeaters on Mt. Larson. In addition, Golf uses a simplex UHF channel (458.525-MHz) for portable to portable communications.

PARD has a dispatch center at 2525 S. Lakeshore Blvd., which operates during normal business hours on weekdays. It is manned by one dispatcher. Dispatch has a base on Channel 1 and a handheld radio on Channel 2.

Some personnel keep radios during off time (nights and weekends). If an after hours emergency occurs, the Electric Department dispatcher pages the on-call individual. They have no radio contact with the Electric Department.

Cellular phones and pagers are used in the department as needed. Some machinery used is too noisy to allow hearing a page or radio call.

Computers are networked in the department. These can be used to e-mail and page personnel.

#### ⇒ Problems & Concerns

- After hours emergencies are handled by managers who are on a rotating shift and carry an "after-hours pager".
- Pagers and radios are hard to hear near noisy machinery.
- Some interference is heard, called "bleed over and garbled transmissions" on the two repeater channels.
- Intermodulation interference on Channel 1 occurs when APD and PARD Channel 2 are on the air simultaneously. Other intermodulation and interference is experienced downtown.
- Radios are old GE and Motorola. GEs seem to break more often.
- Better coverage is needed, especially out of the City to the west. Most notable dead spots are the Green Belts and the Commons Ford Park.
- There is deliberate interference and fooling around on the radio. There have been some radios stolen, which could be causing some of the interference. Also, the channels are busy and congested.
- The Department plans to install unit identification modules in field units and a display in dispatch.

#### ⇒ Needs and Wants

- The paging system used by PARD must be the same as the Electric Department to permit after hour notifications. Radio contact with Electric Department is needed.
- Radio-to-radio communications are needed to allow contact when out of the repeater area.
- A phone patch would be nice to have for occasional telephone communications.
   Originally, Channel 2 was intended for phone patch operation.

#### Park Police

The Park Police are the law enforcement section of the Department. Their duties include patrol of the City's parks, recreation centers, greenbelts, waterways, and preserves.

### ⇒ Organization and Functions

Park Police is grouped into four sub-components: Mobile Patrol, Hike & Bike Patrol, Lake Patrol, and Balcones Canyon Land preserves. Within these groups, officers may perform their duties either by the use of a vehicular mounted communication radio and limited MDT's, or handi-talkies. The majority of their radio communication is performed by the use of handi-talkies.

### ⇒ Current Systems

Park Police utilize the same frequencies as the Austin Police Department and relies on their services for 9-1-1 and dispatch communications. Their mobile and portable units are equipped with emergency identification and scan capabilities, and in addition, these radios are equipped with both Parks & Recreation Department frequencies for coordination and communications with the various groups of the Parks Department. Some of the units are now equipped with MDT's to assist in communications.

Supervisors also have alpha pagers and cellular telephones for additional communications.

Unlike APD, their units are not afforded the ability to remain in a district; they must rove throughout the City and some outlying areas under the Department's control. The ability to scan and rove through districts and channels is an essential need of this division.

#### ⇒ Problems and Concerns

Usually hampered by terrain of some of the park locations, radios prove marginal for reliable communications in the greenbelt or waterways. Very large special events tie-up communications channels, and with the limited number of available channels and the large number of special events, channel utilization is a problem. Handi-talkies batteries do not support a full shift (10 hours) of use if radio traffic is medium to heavy load.

Radio coverage, the ability to have clear and dependable communications, is degrading. Whether due to the age of the equipment or the change in the topography of the area, communications in remote areas or below street level, is almost non-usable.

Units or officers, which do not have MDT's, are further hampered in communications ability. The Park Police desire the ability to equip their entire mobile fleet and a majority of the bike patrol with MDT capability. They must have effective communication in the

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greenbelts and waterways, and the ability to coordinate multi-agency response communications.

#### 4.1.13 Public Information Office

The City of Austin Public Information Office provides media and informational support for the all City departments, the City Manager's Office and the City Council. They maintain contact at all times with local media and provide the immediate contact representative for outside inquiries regarding City of Austin services and programs. The Public Information Office staff also coordinates with the Public Information Officers from other City of Austin and Travis County departments, especially with the Office of Emergency Management and all Public Safety Agencies during emergencies.

They require communication support to provide interoperability with the other Coalition agencies and entities. In addition, the media communication provided by this system will be paramount for this office.

## 4.1.14 Development Review & Inspection

## ⇒ Agency Organization and Function

The Development Review & Inspection Department performs and coordinates review and inspection activity related to community standards for land use and building safety. This Department includes staff in various functions that are required to travel throughout the City and County. There is a staff reduction strategy in place based upon increasing productivity via technology. This Department foresees significant value in increasing field data communications capabilities.

The area of operations for the Development Review & Inspection Department includes some areas outside the City of Austin, and some areas in Williamson and Travis Counties. They also handle inspections for some municipal utility districts.

A Geographic Information System (GIS) is in place. This has been used to help Planning functions in the past, and is becoming an important development tool as well.

### ⇒ Current Systems

The Department now has 65 radios, all of which are on the air weekdays, during business hours. Portables are their primary means of communication as users have been unhappy with their mobile radios.

Dispatch for this agency is handled on an emergency basis only (pulled utility meter primarily) from two desk-top remotes at their main offices. Inspectors are active from 7:30 a.m. - 4:30 p.m. for their shifts. Actual radio use is broader, ranging from 7:00 a.m. - 5:00 p.m.

The Building Inspections Group are currently voice dispatched to perform building inspections and require the ability to access databases maintained within the city planning department. Inspectors are presently using an interactive voice call system to gain access to information. This system is considerably slower than direct computer database access.

At this time all data is supported by the City's mainframe, an IBM 3090, located at Waller Creek, which is connected to the interactive voice system. Two databases located at the Municipal Annex building provide information to building inspectors. The Land Development Review System (LDRS) resides on a DEC VAX/VMS platform while the base city map is located on a DEC Alpha AXP workstation. LDRS is used to track, zone and site plan application processing. They also use a Building Inspection Tracking System (BITS). They want to help consolidate a system that would support e-mail, LDRS, and the BITS data, in one straight-forward application. They are trying to migrate these systems to consolidate all information onto a server in a single location. They have an agreement with USCO, who maintains the system. The mainframe is currently used by 12 departments within the City.

This Department is buying a new application that will allow them to create a program to access their data through a VT-220 terminal or a Windows device by the year 2000.

#### ⇒ Problems & Concerns

All radio problems that have been identified by other radio users are equally noted in this Department. The most significant of these problems are:

- Poor Coverage
- Channel Congestion
- Radio Interference
- · Equipment age/reliability

#### ⇒ Needs & Wants

Coordination with other departments involved in inspections is becoming increasingly important. Some examples include:

- · Fire Department for fire inspections
- HAZMAT units for storage of hazardous materials
- · Health Department for restaurants, septic wells, etc.
- · Water and Wastewater for connections, especially in industrial applications
- Austin Energy
- · Watershed Protection for drawings, etc.

Interface with Austin Police Department and Austin Fire Department is important for buildings that are sub-standard or in high crime areas.

Outside the City, coordination is necessary with the Water Districts and the Utility Districts. Inside the City, there are two gas companies with which they require communication. These are Southern Union Gas, and Lone Star Gas.

The Development Review & Inspection Department also has coordination needs with the Travis County Permitting, with smaller surrounding Cities, and with various State agencies such as Parks and Wildlife. All of this coordination should be performed by Data Communications rather than voice. This is because each of these agencies is responsible for specific databases from which this Department requires information.

Voice communications requirements are relatively light. Two channels will adequately support voice communications for Development Review & Inspection.

#### 4.1.15 Solid Waste Services

## ⇒ Agency Organization and Function

Solid Waste Services (SWS) provides refuse collection, recycling, street cleaning, and anti-littering operations throughout the City.

### ⇒ Current Systems

SWS uses one repeater channel to carry all of its communications. Its dispatch center is at Bergstrom at 2900 Presidential Boulevard, Building 2210. It has a single radio and a VHS-type logging recorder. Dispatch also has a department computer terminal.

Most of SWS's radios are in trucks and are exposed to very rough conditions and all kinds of weather. Most of the radios are trunk mounted with control heads in the driver's compartment.

Normal hours of operation are weekdays 7 am to 4 pm. About 8 units operate at other times.

Radio coverage is adequate.

#### ⇒ Problems & Concerns

 Communications with Fleet Services is not possible. Fleet is a different department but it maintains all SWS vehicles.

- There are too many units on the one channel, causing it to be overloaded. People talk over each other.
- There are also too many different kinds of users on the channel, making everyone hear all conversations.
- The above two problems have frustrated employees and some have abused and caused inference to the system. A logging tape recorder was installed to catch the abuse on tape and has reduced, but not eliminated, the problem.
- Some of the radios, especially the older radios, need to be repaired often. Some need replacing immediately.
- Handheld radio coverage inside buildings is poor.
- No back-up communications capability exists, including no emergency power and no back-up dispatch.

#### ⇒ Needs and Wants

SWS needs about five channels or talkgroups, identified as:

- Channel 1 Collection—Harper
- Channel 2 Collection--Horner
- Channel 3 Recycling
- Channel 4 Street Cleaning
- Channel 5 Supervisors

The dispatch will be moved eventually from Bergstrom and should be updated at that time.

# 4.1.16 Public Works Department

# ⇒ Agency Organization and Function

The Public Works Department is comprised of the following groups: Construction/ Inspection, Streets and Bridges, and Transportation.

## ⇒ Current Systems

These groups operate radio systems on VHF, UHF, and 800 MHz assignments. The operational configuration fore each group is as follows:

## Construction/Inspection

This service group is portable-based and utilizes talkgroups on the Water/Waste Water 800 MHz trunked radio system. The present system consists of 57 portables, 4 control stations, 53 display pagers, and 2 cellular telephone units. Operations are conducted on five dedicated talkgroups.

## Streets and Bridges

This group conducts its operations on two UHF channels. The primary repeater channel is dedicated to their use, however, a secondary channel is shared with the Transportation group. The system consists of 130 mobiles, a small quantity of 74 portables and a dispatch site located at the St. Elmo Service Center.

## Transportation

This group is responsible for signs, traffic signals, taxicabs, and parking control. The Signal Section uses the radio for troubleshooting and is, historically, a heavy air-time user.

Transportation's system consists of 68 mobiles, 78 portables, 11 pagers, 4 control stations, and 5 cellular telephone units. Dispatchers are located at three different sites.

### **Drainage Utility**

The current two-radio users of the drainage Utility are the Watershed protection division (engineering), and the Stormwater Management Division (Operations).

These two divisions operate on one (1) VHF repeater channel. There is one dispatch console and two dispatch remotes located at Two Commodore Plaza. There are also emergency dispatch radios located at the emergency operations Center (EOC) at City Hall, and at the FEWS Field Office at Park 183 (Bastrop Highway).

The Watershed Protection Division is currently using twelve (12) handheld and four (4) mobile two-way radios.

The Stormwater Management Division is currently using thirty (30) handheld and twenty-five (25) mobile two-way radios.

### ⇒ Problems and Concerns

UHF Users reported heavy congestion on the primary channel and talkback problems with portable units. A few instances of co-channel interference had been observed, but none serious in nature.

Transportation users report heavy congestion and the need for more working channels. Numerous dead spots had been reported throughout the City of Austin service areas.

The VHF coverage area is generally adequate, except for low-lying areas. Some instances of co-channel interference have been observed.

Those interviewed indicated a need for more talkgroups and improved portable coverage, particularly in the southeastern and southwestern areas of town.

#### ⇒ Needs and Wants

### **Construction Inspection Division**

The Construction Inspection Division will require 57 portable radios, 4 control stations located at three field offices and the One Texas Center Administrative Office, and 4 desktop remote radios. Operations are currently conducted on 5 dedicated talk groups. The Construction Inspection Division will require interoperability with the following agencies:

- Office of Emergency Management
- Street & Bridge Division
- Transportation Division
- Drainage Utility Department
- Water & Wastewater Department
- Electric Utilities Department
- Austin Police Department
- Austin Fire Department

- Emergency Medical Services
- Travis County Public Improvements
- · Texas Department of Transportation
- · Southern Union Gas
- · Southwestern Bell
- Austin Cablevision
- Lone Star

## Street and Bridge Division

The Street and Bridge Division will require 130 mobile radios, 74 portables, and 1 control station at the Administrative Office located at 4411-A Meinardus Drive. The Street and Bridge Division will need 9 talk groups for 8 separate operations sections, with 1 common talk group. The Street and Bridge Division will require interoperability with the following agencies:

- Office of Emergency Management
- Construction Inspection Division
- Electric Utilities Department
- Austin Police Department

- · Transportation Division
- Solid Waste Services (Street Sweeping)
- · Fleet Services Division
- · Drainage Utility Department
- Water and Wastewater Department
- · Austin Fire Department
- Emergency Medical Services
- Travis County Public Improvements
- Texas Department of Transportation

## **Survey Section**

The Survey Section was eliminated in August 1996, and radios are not required.

### Transportation Division

The Transportation Division will require 68 mobile radios, 78 portables, 4 control stations, and 15 desktop radios. The control stations will be located in offices at 400 Rio Grande Street, 6301 Harold Court, Toomey Road, and the One Texas Center. The Transportation Division will require 6 talk groups. The Transportation Division has requested 30 hands free voice activated headset units that will be used by field technicians. The technicians would need to monitor the mobile radios, have talkaround capabilities, and communicate with the control stations. The Transportation Division will require interoperability with the following agencies:

- · Office of Emergency Management
- Street and Bridge Division
- Construction Inspection Division
- Drainage Utility Department
- Water and Wastewater Department
- · Electric Utilities Department
- Austin Police Department
- · Austin Fire Department

- Emergency Medical Services
- Travis County Public Improvements
- Texas Department of Transportation
- · Southern Union Gas
- Southwestern Bell
- Austin Cablevision
- Lone Star

# **Drainage Utility**

The Drainage Utility Department has a need for the following interdepartmental communication during severe weather events:

- · Office of Emergency Management
- Street and Bridge Division
- Construction Inspection Division
- Water and Wastewater Department
- Electric Utilities Department
- Austin Police Department
- Austin Fire Department
- COA Fleet Services

- · Emergency Medical Services
- Travis County Public Improvements
- Texas Department of Transportation
- Southern Union Gas
- Southwestern Bell
- Austin Cablevision
- Gas Companies
- COA Radio Communications

#### 4.1.17 Water/Wastewater

## ⇒ Agency Organization and Function

The Water/Waste Water (W/WW) Department presently operates a seven channel Motorola trunked radio system. The Department is licensed originally for a ten-channel system, but constructed only eight. The eighth channel is operated as a single failsoft conventional repeater and is located at a secondary site.

### ⇒ Current Systems

The trunked system is located at Mt. Larson. The transmit antenna is tower mounted at 300 feet and the receive antenna is positioned at 250 feet. Both antennas are 9dB, omnidirectional.

The system was installed in 1985, utilizing Motorola Privacy Plus Type I signaling. The system is dispatch only, and has no telephone interconnect capability.

A new dispatch center has been developed at the Southeast Service Center, 3907 South Industrial Drive. Existing CentraCom II series dispatch consoles and Central Electronics Bank equipment have been relocated to this new site. An existing Analog 2 GHz microwave system is to be replaced and relocated (this system is temporarily being replaced by T-1 facilities (Southwestern Bell).

Approximately 728 units are active on the system. Presently, the breakdown is 390 monile units and 30 portable units. Control stations are included in the mobile count. Most are mobile units assigned to service and construction vehicles. The types of equipment include Mostar, Standards, STX portables, and 8000 series units.

Most radio operations are conducted during the day, however, some traffic normally occurs at night. Typically, W/WW responds to 1500 service calls each month. During an incident, such as a freeze, the call volume could run as high as 1500 calls per day.

#### ⇒ Problems and Concerns

- Thirty talkgroups are now programmed, but only severteen (17) are assigned to W/WW, and more are needed. The Department has been reluctant to change its talkgroup structure due to the difficulty and cost to make such changes to the early Mostar and STX radio units. Additionally, Public Work inspectors are assigned one talkgroup (1A) on the existing system.
- Much of the existing user equipment is old and in need of replacement.

- Within Waste/Water plants, the 800 MHz coverage is insufficient for reliable operations. Therefore, due to the limited service area needs for plant operations, each is equipped with UHF (2 watt, 12.5 KHz) splinter-channel repeater systems.
   The above radio counts do not include any of the radios on this system.
- 800 MHz mobile coverage is generally adequate, however, portable coverage is only fair in most of the service area.
- Coverage is especially problematic at the Walnut Creek Plant where some work areas are 50 feet underground.

The Water and Wastewater Utility has expressed an interest for enhanced service features such as Mobile Data Terminals (MDTs), Automatic Vehicle Location (AVL), and some intrinsically safe radio/battery combinations.

### 4.1.18 Radio Communications Division

### ⇒ Agency Organization and Function

The Radio Communication Division (RCD) provides installation and electronic maintenance services to all City of Austin departments and other Local Government entities at the Radio Shop and in all areas of the City and County

#### ⇒ Current Systems

RCD uses one repeater channel to carry all of its communications. Its dispatch center is located at 1006 Smith Road. All of RCD's radios are hand-held and are used only by field services technicians.

Normal hours of operation are weekdays, 7:30 a.m. to 6:00 p.m. Radio coverage is questionable from all areas of the City.

#### ⇒ Problems & Concerns

RCD presently does not use the system for communications. There is only one station receiver located at Mt. Larson and reception in all areas of the City is questionable. RCD expects to use this channel in the near future.

### ⇒ Needs and Wants

RCD has a need for one talkgroup that has reception capability in all areas of Travis County, including 95% reception capability in all buildings.

### Fleet Maintenance Operations

### ⇒ Agency Organization and Function

Fleet Services has 7 sites throughout Austin where vehicles and equipment are repaired.

### ⇒ Current Systems

Fleet Maintenance Operations has 6 base stations, 17 mobile radios, and 5 portable radios. All of these radios operate on a single channel.

#### ⇒ Problems and Concerns

All of the base radios are over 10 years old. Having to share a channel with another user department is a problem.

### ⇒ Needs and Wants

Portable radios, mobile radios, and base stations need to be replaced with new ones.

# 4.2 Travis County

#### 4.2.1 Sheriff's Office

## ⇒ Agency Organization and Function

The Travis County Sheriff's Office, in addition to Administration, is comprised of three Bureaus--Law Enforcement, Corrections, and Support. These Bureaus are divided accordingly:

- Law Enforcement
- > Patrol
- Criminal Investigation
  - Crimes against persons
  - Crimes against property
  - Narcotics
  - Auto theft
  - Child abuse
- Administrative & Support
  - > Radio Communications

- > Courthouse Security (CHS)
- > Transportation
- Mental Health Unit
- > Training
- Corrections
  - County Jail
  - > Correctional Complex
  - > Central Booking

The Travis County Sheriff's Office (TCSO) includes a total of 700 correctional officers and 250 law enforcement officers. In addition, there are approximately 300 civilian employees, bringing the total staff to 1,250. TCSO is dependent on two different radio systems—The Corrections Bureau operating on UHF and Law Enforcement operating on VHF.

### Corrections Bureau

The Corrections Bureau currently operates a central booking facility at the APD Headquarters and is planning a move to a new facility. This Bureau also operates the Travis County Jail located at 10th and San Antonio Streets. The Corrections Bureau includes 26 buildings (with expansion planned to 30) at the Del Valle complex, with each building having one control point.

		Receive	Transmit	PL
Channel 1	TCCC Admin	453.4375	458.4375	151.4
Channel 2	Building 2	453.4875	458.4875	151.4
Channel 3	Building 3	453.5375	458.5375	151.4
Channel 4	Building 4 & Honors	453.5875	458.5875	151.4
Channel 5	Wk. Release	453.6375	458.6375	203.5
Channel 6	Maintenance	453.6875	458.6875	151.4
Channel 7	Building 1	453.3375	458.3375	151.4
Channel 8	ALERT	453.5625	458.6525	218.1
Channel 9	Buildings 5-10	453.7875	458.7875	151.4
Channel 10	TCJ	453.9375	458.9375	103.5
Channel 11	County-Wide	453.7500	458.7500	151.4
Channel 12	Transportation	453.7000	458.7000	88.5
Channel 13	Car-to-Car	453.7000	458.7000	71.9

These frequencies will be retained by Corrections for the security functions. The Bureau expects to request trunked radios for interoperability in five specific areas in need of that

capability. Those are: Transportation, Complex Security, Mental Health, Facilities and CORE. The Complex Security Section patrols the outside of the various facilities. Facilities uses inmates to assist in the delivery of meals and many other items across the City and County. CORE is the "Boot Camp" program that takes inmate work crews out of the facility to perform public works in the City and the County. Transportation and Mental Health are units organizationally attached to the Administration & Support Bureau and are described there.

### Law Enforcement Bureau

The Law Enforcement Bureau of TCSO includes Patrol and Investigations. These operations are handled by a central dispatch at 9301 Johnny Morris Road. This is the County's primary PSAP. Austin Police Department 9-1-1 experienced a point where they were receiving more 9-1-1 calls than could be effectively supported. As a result, this Sheriff's Office facility was set up to serve as an overflow for the primary 9-1-1 facility.

The Law Enforcement Bureau operates VHF channels as follows:

- Channel 1 North Patrol
- · Channel 2 South Patrol
- Channel 3 Lake
- Channel 4 Inter-City Mobile-to-Mobile
- Channel 5 Inter-City Mobile-to-Base
- Channel 6 Constable

## Criminal Investigations Division (CID)

Criminal Investigations has a staff of 50, of which 35 are assigned to a mobile-equipped vehicle (total of 405 vehicles in the S.O.). The detectives seldom use the radio for daily operations. The radio is used mainly as an interface to Patrol and for emergency situations.

### **Patrol Division**

The Patrol Division is dispatched from the Sheriff's Office station on Johnny Morris Road, which is commonly referred to as the East Substation. Patrol has office space on the west side of the County in the County Road Maintenance facility as well as at the Johnny Morris Road site. The Sheriff's Patrol Division responds to both routine and emergency calls for service in the Travis County unincorporated areas. The Sheriff's Office also has an Interlocal Agreement with Jonestown, which is located in the far northwest corner of Travis County. Under the agreement, the Sheriff's Office responds to emergency and routine calls in the Jonestown incorporated area.

The Patrol Division currently employs approximately 137 personnel, and is organized as follows:

- Traffic Enforcement (12 personnel plus two supervisors)
- Lake Patrol (five boats, three full time personnel to enhance summertime staff)
- DARE (six officers located in schools)
- Crime Prevention (two officers for community education)
- Livestock Impoundment (one officer)
- Patrol (includes officers and supervisors)

The Patrol Division works overlapping shifts and can staff up to 26 patrol officers and five supervisors as needed. In addition, Patrol currently has approximately 15 reserve officers who provide assistance during special events. The reserve officers work on an unpaid basis.

All Patrol staff have marked vehicles permanently assigned to them, and they are required to take them home at the end of the day. The Sheriff's Office has found that the patrol units are cared for under this program. All patrol units are equipped with mobile radios. In addition, each person is also assigned their own dedicated portable radio and battery charger. The handheld radios in service at this time come from a variety of manufacturers. Mobile radios are primarily General Electric Ranger units.

Patrol currently uses both digital and alphanumeric pagers for their day-to-day business. Paging service is obtained from AT&T Communications.

#### SWAT

The Travis County SWAT team consists of approximately 14 officers who serve felony (high risk) warrants throughout Travis County and other surrounding counties on an asneeded basis. SWAT personnel are also on-call for unplanned missions. Their normal work week consists of an 8:00 a.m. to 5:00 p.m. routine, Monday through Friday. However, unplanned events frequently result in work beyond the normally scheduled week.

The Travis County SWAT team primarily handles events outside the City of Austin; however, they frequently respond to events along with the City of Austin SWAT. Currently, Travis County SWAT is unable to communicate directly by radio with Austin P.D. SWAT personnel. They are also unable to communicate with the STAR Flight helicopters by radio. Both agencies operate command posts in which communications activities are coordinated for events. Direct radio-to-radio communications is severely needed, and must be provided in the development of the new communications system.

The SWAT team is dispatched by the Sheriff's Office Dispatch Center, via alphanumeric pagers, which are carried by all SWAT personnel. The Dispatch Center alerts the SWAT

person on call, who then determined the appropriate and needed response. The on-call personnel formats a call-out text message and has the Dispatch Center transmit the message to the alphanumeric pagers. Paging service for the Sheriff's Office SWAT team is provided by AT&T Communications. Once on scene, the SWAT team uses portable radios with headsets. The perimeter team and snipers operate on separate channels to be able to communicate simultaneously without interference or waiting. Full duplex capability is needed along with voice encryption capability.

The SWAT unit currently has two radio channels that are used as follows:

- Emergency Entry Team (Tx/Rx 458.7375, also a Jail frequency)
- Sniper and Observers (Tx/Rx 4537500, also a Jail frequency)

### ADMINISTRATIVE SUPPORT BUREAU

### Transporation

Transportation moves inmates from the Del Valle complex (TCC) to the downtown jail (TCJ) for court and medical reasons. In 1996, they made 119,000 inmate moves. These officers need the ability to talk with other agencies if they incur a vehicular malfunction, an injury or inmate escape, or armed hijacking attempt while in transit.

### MHU

The Mental Health Unit (MHU) answers calls for assistance with suspected Emotionally Disturbed Persons (EDP's) throughout Travis County. The calls are generated by hospitals, mental health professionals, emergency medical employees, and Police Officers from every agency (including APD) in the County.

### Radio Communications

The Sheriff's Office Communication Center currently handles an annual call volume of approximately 45,000 calls. In addition, the non-emergency call volume is approximately 56,000 calls annually. The Sheriff's Office currently handles approximately 109,788 field incidents annually, of which approximately 50 are mutual aid incidents.

Dispatch personnel operate on the following shifts:

- 6:00 a.m. to 2:00 p.m.
- 2:00 p.m. to 10:00 p.m.
- 10:00 p.m. to 6:00 a.m.

City of Austin Request for Proposal No. RFP VC9830024 Issued on 6/22/98

The Dispatch Center is staffed by six personnel at all times. The Dispatch Center supports six call-taker positions, it is equipped with six incoming 9-1-1 trunks. The 9-1-1 calling equipment was manufactured by TCI, which was installed in May of 1997.

The Sheriff's Office provides dispatching services for other law enforcement personnel in the area, including:

- City of Manor (East area)
- Sunset Valley (South)
- Mustang Ridge (Southeast corner)
- · City of Rollingwood

These communities typically have two law enforcement officers on duty.

The Sheriff's Office also dispatches the County's Rabies Control Unit, which enforces health code regulations for animals. The Sheriff's Office had originally planned to also dispatch volunteer fire departments; however, this did not occur. The Sheriff's Office Dispatch Center does have the capability of communicating with the volunteer fire departments on the county-wide fire channel.

### ⇒ Current Systems

The TCSO CAD is currently running off of the County NCR system and is separate from the APD CAD system.

Travis County Sheriff's Office currently operates a mobile command vehicle in which they support a variety of other Public Safety providers on an as-needed basis. The unit is frequently utilized for hostage negotiation scenes. The Patrol unit currently uses nine mobile data terminals on the City of Austin mobile data system. Sheriff's Office personnel indicated that the mobile data system worked fairly well, however, they prefer to utilize notebook computers rather than the traditional mobile data terminal, because they are more flexible. The County is currently in the process of replacing its current mainframe computer and software.

The primary Dispatch Center, located at the substation, is located in the small room, which is equipped with four radio consoles manufactured by Kustom Electronics. The dispatch consoles are linked to the repeater sites using control station radios. The consoles are approximately two to three years old. The Dispatch Center is currently about 650 square feet in size.

The Dispatch Center is equipped with an auxiliary power generator, should commercial power outages occur. The Sheriff's Office is also in the process of setting up a backup battery power system to support communications. There is a small Rohn 25 tower, approximately 100 feet tall, located at the facility

The dispatch at this location is equipped with both APD CAD and TCSO CAD, as well as two paging systems, and all APD channels, all Correctional channels, and all TCSO channels.

Nine Law Enforcement mobile units are equipped with MDTs. These are used for license check, etc., but are not equipped to support dispatch operations.

The Sheriff's Office operates a computer aided dispatching system, which resides on the County's NCR mainframe, which is approximately 13 years old. This system is currently supporting eight terminals and three printers. The Dispatch Center currently supports a Dictaphone Logging Recorder equipped to support 64 channels. There are also four Dictaphone instant recall recorders in use.

The Sheriff's Office currently operates approximately 400 portable radios and 500 handheld radios. The radio system supports the following VHF channels:

- S.O. Channel 1 (156.030/154.085 MHz, PL = 151.4 Hz)
- S.O. Channel 2 (155.955/153.935 MHz, PL = 151.4 Hz)
- Sheriff Lake Channel (156.090/155.310 MHz, PL = 151.4 Hz)
- Channel 4, Intercity Mobile (154.950/154.950 MHz, PL = Carrier Squelch)
- Intercity Mobile-to-Base (154.950/155.370 MHz, PL = Carrier Squelch)
- Sheriff 3 (155.640/154.845 MHz, PL = 151.4 Hz)
- County EMS (155.715 MHz, PL = 151.4 Hz)
- APRN (156.150/155.610 MHz, PL = 186.2 Hz)
- Weather Channel (162.400 MHz, PL = Carrier Squelch)
- Williamson County (155.625/154.860 MHz, PL = 151.4 Hz)
- Bastrop County (156.000/154.115 MHz, PL = 186.2 Hz)
- Caldwell County (155.730/154.815 MHz, PL = 151.4 Hz)
- Hays County (154.800/155.865 MHz, PL = 151.4 Hz)
- Burnet County (153.740/155.010 MHz, PL = 151.4 Hz)

The Sheriff's Office's primary Dispatch Center located at the sub-station, answers all incoming calls for the Sheriff's Office, both emergency and administrative calls. Administrative calls are transferred to the Administration Building located at 1010 Lavaca Street across the street from the Courthouse. Dispatch consoles are equipped to communicate on the following radio channels:

- S.O. Channel 1
- S.O. Channel 2
- · S.O. Channel 3 (Lake Patrol)
- Intercity Mobile
- · Intercity Base
- Constables (Channel 6)

### ⇒ Problems and Concerns

The current dispatch facility on Johnny Morris Road is located next to a bulk gasoline storage facility with nine large storage tanks. This is of significant concern in terms of the physical security and risk to this facility.

- S.O. Patrol indicated they currently have a variety of problems with their communication system, including:
  - Inadequate coverage Coverage problems are experienced throughout the County with both mobile and handheld radios. Portable radios were indicated to be especially bad even in small structures such as Stop 'n Go stores.
  - Channel interference S.O. personnel experience radio interference from a variety of sources. One of the more noteworthy offenders was the Hope, Arkansas Police Department, which frequently overrides the Sheriff's Office's own traffic.
  - Channel congestion S.O. personnel indicated their dispatch channels frequently
    get overcrowded during busier peak hours, making it difficult to communicate with
    dispatch and field personnel as needed.
  - Inadequate backup facilities The Sheriff's Office needs improved backup facilities in the areas of dispatch centers, auxiliary power, and backup repeater and tower facilities. Repeaters for the current system are located at the City of Austin Mt. Larson tower site.
  - Inadequate inter-agency communications The Sheriff's Office cannot communicate at all with Austin P.D. by radio. In the new system, the Sheriff's Office needs direct radio-to-radio communications with Austin P.D., the Austin Fire Department, and all other Public Safety providers located within the County. They also need the ability to communicate by radio with neighboring Sheriff's offices and Round Rock Police Department, if possible. S.O. units make frequent trips into the City of Round Rock. Sheriff's Office radios should all be equipped with talkaround capability to facilitate unit-to-unit communications when operating beyond the range of the new communication system. The current system does not provide unit identification from user radios. For the new system, the Sheriff's Office needs unit I.D. capability with all mobile and portable radios.

Sheriff's Office personnel indicated that most of the Department's radios are not all that old. There are some mobile radios that are about six years old, however, the Department recently bought 70 to 80 Motorola Visar portable radios to replace their older units. All portable radios are currently equipped with speaker mics, and personnel indicated that they would like to continue this capability in the new system. The current radio system

does not support encryption capability, however, it is definitely needed to communicate information without eavesdropping.

Sheriff's Office personnel indicated that there are a number of shortcomings in the current communications center, including:

- · No dedicated meeting place
- · No dedicated training area
- Lack of security
- · Inadequate amount of space
- No room for expansion
- · No privacy for supervisors
- · Located adjacent to bulk fuel storage tank farm
- Too close to hazardous materials
- Phone lines supporting the facility are inadequate and of poor quality
- Limited backup capabilities

The Sheriff's Office also operates a backup dispatch center located at the County Courthouse, which is equipped with two Motorola CentraCom I consoles that were installed about ten years ago. Motorola's CentraCom I technology was discontinued by the manufacturer about ten years ago, which means that spare parts are very difficult to obtain these days.

SWAT personnel indicated that they frequently lose pages, which means that some pages are never received by field personnel. SWAT team members indicate that AT&T claims their software shows the pages were actually transmitted, however, frequently, field personnel do not get the message or receive only partial messages. The dispatch message typically includes the type of call, location, and the location of the staging area. The Sheriff's Department Command Post shows up at the staging area to facilitate operations.

CID would utilize the radio system if more channels were available and calls did not have to be routed through dispatch. The location of control stations within the various sections would simplify communications with field-located staff.

The Crime Prevention Section reported that a radio system configured to satisfy the needs of the patrol officers would equal or exceed their requirements. The Crime Prevention staff is comprised of 9 officers, (3-CP, 6-DARE) and two supervisors, each of which has access to a mobile-equipped vehicle and portable radio.

#### ⇒ Needs and Wants

The SWAT perimeter team and snipers operate on separate channels to be able to communicate simultaneously without interference or waiting. Full duplex capability is needed, along with voice encryption capability. The Sheriff's Office has requested that

400 mobile radios and 500 portable radios be incorporated into the budgetary cost estimate for the new system.

# 4.2.2 Fire Fighter's Association

## ⇒ Agency Organization and Function

Sixteen volunteer fire departments serve the Travis County area. They are as follows:

South East Travis County

CE-Bar

Pflugerville

Jollyville

Oakhill

Volente

Lago Vista

. 969

Manchaca

Hudson Bend

Elgin

Manor

· Pedernales

Jonestown

Sandy Creek

· West Lake

Seven of the departments are dispatched by contract service provider, Gold Cross. Fire service calls are received by Gold Cross, via radio page and 9-1-1 call transfer from the Austin Communications Center or via the department's specific seven-digit telephone number.

Fire personnel are then dispatched to the call via radio paging and transmissions on that department's specific dispatch channel.

# ⇒ Current Systems

All departments presently operate VHF repeater systems for primary dispatch and use talk around (repeater output frequency) for fire-ground communications.

Departments not using Gold Cross for primary dispatch utilize a multi-drop telephone fire link where calls for service are simultaneously routed to multiple volunteer dispatchers. The "active" dispatcher answers the incoming call and then alerts department fire fighters via two-tone voice pagers active on their specific primary dispatch channel.

### ⇒ Problems and Concerns

Department specific data is summarized below:

#### West Lake:

- · Operate three engine houses
- 25 mobiles, 30 portables, 55 tone/voice pagers and 50 alpha-numeric pagers
- Share simplex fire-ground channel with Cedar Parks primary channel

- Coverage problems in Rollingwood and East of the Lake
- · Equipment is new and in good operating condition

### Jollyville:

- · Operate two engine houses
- 5 apparatus radio units
- VHF repeater primary channel
- No coverage problems with existing system
- · Respond to Austin FD calls
- No direct interoperability with AFD units

### Manchaca:

- · Five engine houses/15 apparatus units
- 25 square mile service area
- Annual service call volume 428 calls
- · VHF repeater (primary), Simplex fire-ground channel
- 25 mobiles, 20 portables, 70 tone/voice pagers and 3 cellular telephones
- Desire MDT services
- · System has been recently rebuilt and provides good coverage

## Manchaca EMS:

- · Apparatus located at volunteer sites
- Desire access to county-wide EMS channel (155.715/153.995)
- Hospital emergency room radio access desired
- 25 mobiles, 15 portables, 2 control stations, 20 tone/voice pagers and 3 cellular telephones

#### Manor:

- 3 engine houses/10 apparatus units
- 80 square miles service area
- Annual service call volume 600 800 calls
- 35 mobiles, 18 portables, 20 alpha-numeric pagers and 20 tone/voice pagers (EMS)
- Equipment is less than 3 years old and is in excellent condition
- Coverage problems east of Austin

#### ⇒ Needs and Wants

Generally described needs included centralized dispatch, county-wide coverage and interoperability with County and local area Police, Fire and EMS Departments.

## 4.2.3 Emergency Medical Services

County EMS is discussed in Sections 4.1.3 and 4.2.08.

## 4.2.4 Transportation and Natural Resources

### ⇒ Agency Organization and Function

TNR is Transportation and Natural Resources. It includes the following County divisions:

- Parks & Natural Resources Division (includes parks, preserves, BCCP administration, hazardous materials, water quality, environmental protection);
- Administrative Services Division (includes department-wide administrative support);
- Planning & Engineering Services Division (includes Building Permits, Planning, Engineering, and Inspection);
- · Financial Services Division, and
- Road Maintenance & Fleet Services Division (includes Dispatch, Roads Maintenance, and County Fleet Services).

Dispatch serves only TNR current divisions; however, the Park Rangers also use TCSO and TCEMS channels for emergency communications, and may also, when necessary, communicate with local volunteer agencies out in the county. TNR Dispatch operates 6:30 am to 6:00 pm weekdays and on a call-out basis as needed. There are two full time dispatchers, one full time Supervisor, and one Operations Manager (who manages both Dispatch and Telecommunications). Dispatch is located at the Executive Office Building, 411 West 13th Street in Austin and is the primary contact between the TNR Main Office and field personnel.

Dispatch is the primary point of contact for the public requiring TNR services. It receives about 125 phone calls each day.

Dispatch prepares all work orders for services of TNR agencies. Work order process is:

- Dispatcher receives a request on paper or by telephone (about 25 per day)
- Dispatcher enters info into computer
- · Dispatcher prints work order and faxes to appropriate department

- · After work is completed, department sends work order back to dispatch
- Dispatcher enters updated info into computer
- Reports are produced on weekly or monthly basis to analyze work requests
- Dispatch tracks the location of Fleet Equipment

This process may be a future application for MDT system automation.

## ⇒ Current Systems

Dispatch has two Zetron consoles with the same six radio channels:

•	Channel 1	Talkaroundused for flagging, foot patrol in parks	
	Channel 2	Mobile-to-mobileused for intercommunications between field units	
٠	Channel 3	Dispatch-used to coordinate most of TNR's functions with everyone on it	
ě	Channel 4	Auxiliaryused by Water Delivery for their office to field units	
	Channel 5	Supervisors/Administrationused for administrative coordination	
	Channel 6	Lakeused by Parks and others working in the Lake area	

All channels are repeaters except Channel 1. All are located at Mt. Larson, except Channel 6, which is located near the Lake. Channel 2 and Channel 3 each have seven voting receivers with voting comparators at the Austin Radio Shop. All base stations and repeaters are connected to Dispatch with leased telephone lines, except Channel 6, which uses a control station radio located at Dispatch to provide the link to the Lake repeater.

All mobiles have Channel 1 through Channel 4, with supervisors also having Channel 5 and Channel 6. Lake area units also have Channel 6. Some supervisors and all Park Rangers also have other channels such as TCSO, TC EMS, and TC VFD. There are 195 portable radios, 200 mobile radios, and 14 office control stations.

Dispatch is kept very busy on Channel 3, but also tries to monitor Channel 2 and Channel 6. In the future, they may convert Channel 2 and Channel 4 into mobile-to-mobile channels for the North and South areas, respectively.

Personnel makes extensive use of the Radio Pager System and have great success using it. Alphanumeric messages are entered via software on the computer system or via "Alphamates" at some locations. Over 50% of all pages are initiated by Dispatch.

#### ⇒ Problems and Concerns

The primary problem is too many users, and too many dissimilar users, on one channel (Channel 3). TNR estimates that about 500 transmissions per day occur.

There are some coverage problems at Pace Bend, Webberville, and the Hamilton Pool. Coverage problems also exist in northwest and northeast Travis County.

Dispatch suffers from significant background noise. The console microphone picks up everything in the room. People walk through the room as a short cut and chat with the dispatchers. Also, personnel come to dispatch to check up on or update work orders (only a couple of offices have computers on the work order system). Dispatch monitors weather radar when thunderstorms are evident. Dispatch pages all affected personnel, informing them of the condition.

The consoles are only 3 years old (bought at the same time as TCSO's consoles). They have been trying to get headsets to work with both the radio console and the telephone instrument.

The equipment is in good condition, with base and repeater stations and the consoles being three years old, and mobiles and portables less than ten years old (most less than four years old).

Occasional interference is experienced from Arkansas Highway Patrol ("Magazine Highway Patrol to Little Rock Central"). Their repeater is heard on the dispatch channels.

When all channels are selected (simul-select), there is a mix of transmitter frequencies that interfere with LCRA

#### ⇒ Needs and Wants

Both dispatch and some mobiles (supervisory) need the ability to communicate with the TCSO, TC Volunteer Fire Departments, TC EMS, LCRA, and City of Austin EMS, Fire Department, Electric Utility, Public Works, and Parks.

Radio coverage is desired within the TC Courthouse Complex and on the outside edges of the County.

TNR wants to include 250 mobiles and 250 portables in the planning for the new system.

In the future, TNR wants to incorporate the use of MDT's with field operations, specifically for the park rangers, but possibly for inspectors and road maintenance supervisors.

### 4.2.5 Constables

### ⇒ Agency Organization and Function

The County Constable has similar power and authority as the Sheriff's Office by State Law and the Rules of Court. As a result, Travis County has divided the law enforcement operations as follows:

- Sheriff handles most patrol and criminal investigative law enforcement requirements of the County.
- The Constables provide civil process and misdemeanor warrant service. The
  Constables also has state-wide arrest authority. The Constable is also required to
  support Writ Service within contiguous jurisdictions. In Travis County, these
  jurisdictions cover 6 adjacent counties.

Regular Constable deputies typically work 8:00 a.m. to 5:00 p.m., and ASAP deputies typically work 6 p.m. to 9 p.m., although these hours vary. Operations are divided into five Precincts. Officers typically serve within their Precinct, but often go county-wide and outside the county.

- Precinct 1 serves the Northeast portion, and is located at 1811 Springdale Avenue.
   It is supported by one Dispatcher with a control station. There are six officers on the street at one time, plus approximately seven temporary officers and five reserve officers.
- Precinct 2 serves the Northwest, North Central, and Northeast parts of the County and is located at 10409 Burnet Road, Suite 150. This Precinct is equipped with two control stations and nine DC remotes supporting a total staff of 17 personnel, including temporary officers, plus five reserve officers.
- Precinct 3 is the Southwest part of the County. It is located at 2919 Manchaca Road. This Precinct has nine full-time officers, six part-time officers and five reserve officers. It is supported with one control station and four desk top remote set.
- Precinct 4 is the Southeast portion of the County and is located at 2201 Post Road, # 102. This Precinct has five full-time officers, 11 temporary officers, and five reserve officers.

Precinct 5 serves the Central downtown area. This includes 30 deputies, 3 temporary officers and 20 reserve officers. There are 3 dispatchers plus a Warrant Clerk in this Precinct. It is located at the County Courthouse, 1000 Guadalupe, Room 111. This facility is equipped with an old CentraCom I dispatch console with two channels. It also has 4 DC desktop remotes. In the future system, eight control points are required at this facility.

The City/County Emergency Operations Center (EOC) is also located downtown. The Department of Public Safety also has a separate dispatch center located in Travis County. At this time there is no backup for the Police Department headquarters, 9-1-1 and Dispatch facility. Public Safety officials are very concerned about the physical security of this facility.

The Constable uses City radio towers and City maintenance via an inter-agency agreement. The tower in use is Mt. Larson at the western edge of the City as their primary operating tower.

### ⇒ Current Systems

All Constable operations are supported by the Travis County Sheriff's Office (TCSO) Channel 6 as their prime channel, their secondary channel is TCSO Channel 3. Precinct 2 and Precinct 5 are equipped with a second control station each on TCSO channels for interoperability.

Constable operations make heavy use of alpha-numeric pagers. This allows them to handle their operations with minimum voice requirements. They will often use the alpha-numeric pager as a means to answer a field officer with information about a license plate or license check. Constables are not equipped with MDTs at this time. There are nine Sheriff Office units equipped with MDTs at no charge from the City

#### ⇒ Problems and Concerns

Because Constables all share one channel that is also used at times by Sheriff deputies, they have to wait for other users to clear the channel before initiating a new conversation.

Constables have recently purchased late model portable radios. These will still be fairly new and have significant service life left at the time that a new system goes in. As a result, they are considering methods of transferring them to miscellaneous volunteer fire department and other groups. They expect another five to ten years for those groups to move on to an 800 MHz system.

The County has considered having Centralized Dispatch for all Constables and Sheriff's Operations for routine operations. There is a consultant currently retained for the County

to investigate consolidating all City and County Dispatch operations in the County Courthouse. This is not seen as realistic since there is insufficient space at that facility. The report from that consultant has not been received yet. There is no information as to its status.

#### ⇒ Needs and Wants

The Precinct facilities each require at least five remotes in addition to their control stations. Each control station and remote should be supported with battery backup for two to four hours.

#### 4.2.6 Juvenile Court

### ⇒ Agency Organization and Function

The Detention Facility is a 24-hour operation. The Detention Facility has 64 beds and at this time is supporting 80 children. The emergency capacity is 122 juveniles. The highest the population has been is 119 children. The facility is located at 2515 S. Congress Avenue. In 1989, there was a disturbance at this facility, which demonstrated concerns about communications.

There are approximately 60 Juvenile Detention Officers supporting the 24-hour mission of the facility, with one-third of these officers typically on duty at any one time. Approximately 30 portables are required.

### ⇒ Current Systems

At this time, there is a base station licensed to the department. However, this station is not very reliable according to those officers interviewed. As a result, officers use talk around with two- channel portable radios. This facility is on a six acre lot, which is at the limits of reliable talk around operation. They also have a generator for emergency situations. It is intended to operate for eight hours and is maintained by the department. The Detention Facility is supported by a central control point in a secured area, which acts a communications base station.

#### ⇒ Needs and Wants

The Detention Facility needs two channels in the new system, one for operations and the other one for support. In addition, there are three wide-area channels required. This yields the following list: Detention Operations 1, Detention Support, and Administration.

Mutual aid is of particular concern to this department, especially with the Austin Police Department, Austin Fire Department and EMS. In 2000, this department will be adding a

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100 bed long term Residential Treatment Facility. This new facility will require communications on other channels. In 2001, 24 beds will be added to the Detention Facility. This will increase the staffing of the facility by 10 officers. The Department will require extremely reliable coverage inside buildings.

### 4.2.7 Elections

#### ⇒ Needs and Wants

The Department would like the opportunity to utilize the planned mobile data system to help ensure voter security during the election process. The Department has 15 off-site locations, which in the past have used paper lists to verify voter registration. They have done some pilot programs utilizing modem equipped PCs with telephone lines back to the central election bureau. They also have five mobile voting units that go to different locations everyday during early voting time periods.

The Department needs to get validation of voter registration at the time of voting and to annotate the central file with the information that that individual has voted in the current election to preclude an individual voting numerous times at a variety of locations. When a question arises about voter registration, they are currently using cellular telephones from the locations to call the central bureau for verification. This has become a very expensive process. The remote locations need direct access to the central data base so that vote registration can be verified in an automated and prompt fashion.

Under the new county-wide radio and mobile data system, the Department would like to have about 25 portable radios to replace the current expensive cellular telephones. The Department would also like to investigate the capabilities of the planned mobile data network to determine the feasibility of using this network, combined with laptop portables, to accomplish the voter validation process. In the context of a new trunked radio system, this Department would need a single talk group set aside for its use to preclude interference with other operating agencies.

# 4.2.8 Department of Emergency Services

The Travis County Department of Emergency Services (TCDES) performs a diverse public safety mission comprising of four operational areas: Emergency Medical Services, the Office of Emergency Management, the Office of the Fire Marshal and STARFlight. The Emergency Medical Service (EMS) section provides medical direction, education, emergency response and quality improvement to more that 300 first response personnel. Funding is also provided for ground ambulance transportation services through the City of Austin (COA) EMS.

The Office of Emergency Management (OEM) serves as the focal point of disaster preparedness, mitigation, response and recovery capabilities for Travis County in concert with the various municipal governments. Travis County assists with the staffing and sponsoring of a joint City of Austin/Travis County Emergency Operations Center.

The Office of Fire Marshal is a law enforcement agency, which provides inspections and investigates arson. The Fire Marshal also assists local fire protection agencies with technical advice and support.

STARFLIGHT is the public safety aviation program providing EMS, rescue, fire suppression and law enforcement support. Based upon the scope of responsibility, all divisions have needs to communicate on both VHF and UHF frequencies. Currently EMS and STARFLIGHT operate primarily on VHF and are dispatched by the COA EMS on VHF although the COA EMS system operates on UHF. Fourteen county first responder organizations operate on their independent VHF. The Fire Marshal's office operates primarily on VHF while communicating with first responder groups. The Travis County Sheriff's Office (TCSO) provides dispatch communications for the Fire Marshal on VHF. The Office of Emergency Management utilizes TCSO as dispatch but on an infrequent basis. All communications are on VHF.

#### ⇒ Needs and Wants

Due to the diverse nature of TCDES, communication equipment is essential to performance of duty. All radios, both mobile and portable, should be digital. Each individual will need one portable, one spare battery and one charger. Four of the vehicles have been designated as Command vehicles and should have dual control heads along with two additional portables and spare batteries. One control station with antenna will be needed for the office.

# 4.2.9 District Attorney's Office

## ⇒ Agency Organization and Function

The Investigation Division provides support to staff attorneys in case preparation for Grand Jury and Trial. They also investigate allegations of crime brought directly to the District Attorney. As commissioned Law Enforcement Officers, the primary services provided are all investigative in nature at the next higher level within the Criminal Justice System. At present, there are 17 investigators and a secretary in the Division.

### ⇒ Current Systems

The vehicles in the 3 divisions have radio communication with the Travis County Sheriff's Department. The primary assigned channel is 6. They have TCSO channels 1 and 2,

intercity mobile-to-mobile, intercity mobile-to-base. The Department has no alpha pagers. They rely on cellular telephones and pagers for most of their communication.

#### ⇒ Problems and Concerns

At present, the use of mobile radio communications is minimal at best. This is due primarily to inadequate inter-agency communication ability. Investigators would benefit greatly from the ability to talk to all law enforcement agencies in the County. Their current radio equipment is from 10-16 years old. Coverage problems for some areas of the County were common when they were using the radios more, as was interference caused by outside agencies.

#### ⇒ Needs and Wants

The District Attorney's staff needs a system strong enough to cover their area of responsibility. They also need the ability to communicate with all law enforcement agencies they service in Travis County. They need encryption capability on all equipment, along with a private operating channel due to the sensitive nature of cases. When working outside of the Austin/Travis County area, it would be helpful to have some type of communication like the intercity car-to-car and car-to-base. The District Attorney's office has requested 20 digital handheld portable radios with voice encryption option. They have also requested a Vehicular Charger/Converter with mic and antenna for mounting in the Investigator's vehicle. This capability will greatly enhance officer safety as the Investigator would be able to carry communication along with them, rather than relying on a vehicle unit or having to dial a cellular telephone in an emergency.

# 4.2.10 Travis County Attorney's Office

### ⇒ Agency Organization and Function

The Investigation Division of the City Attorney's Office provides support to staff attorneys in case preparation for Grand Jury and Trial courts. They also investigate allegations of crimes brought directly to the County Attorney's Office. At present, there are three Investigators.

### ⇒ Current Systems

The County vehicles assigned to the office have mobile radio communications with TCSO, APD, and Intercity. They rely on cellular telephones and pagers for most of their communications.

#### ⇒ Problems and Concerns

At present, the use of mobile radio communications is minimal. This is due primarily to inadequate inter-agency communication ability. Their Department would benefit greatly from the ability to talk to ALL law enforcement agencies in Travis County, as well as surrounding counties. Current radio equipment is from 10-16 years old. Coverage problems are common in many areas of the County.

### ⇒ Needs and Wants

The Travis County Attorney's staff needs a radio system that has better coverage (areas and agencies) to allow them to perform their responsibilities. When they are working outside Travis County, they need intercity type of coverage, such as talkaround and NPSPAC Mutual Aid frequencies. A system with better coverage (areas and agencies) will enhance officer safety for this Department, as well as improve their ability to perform the duties of the County Attorney's Office.

## 4.2.11 Information & Telecommunications Systems

### ⇒ Agency Organization and Function

ITS is the Travis County Information & Telecommunications Systems Department. Under the auspices of the Executive Manager for Administrative Operations, the ITS departments provides computer, telecommunications, and infrastructure support to all Travis County offices. ITS consists of four divisions: Administration, Business Systems Solutions, Customer Support Services, and Operations & Technology.

The primary users of radio services and equipment are the Customer Support and Operations and Technology Division. The administrative division currently administers radio repair invoicing for TNR and other non-law enforcement offices in Travis County.

Customer Support and its HELPDESK service is the central contact point for all County department requests for computer, telecommunications and other technology support services. There are two full time HELPDESK technicians, operating the HELPDESK at any given time. Dispatch is located at the Travis County Administration Building, 314 West 11th Street in Austin and is the primary contact between the ITS Main Office and field support personnel.

As the primary point of contact for the staff requiring ITS services, the HELPDESK receives more than 200 phone calls each day. The HELPDESK prepares all work orders for services of ITS agencies. The work order process is:

- · HD Technician receives a request by telephone
- HD Technician enters info into computer
- HD Technician directly contacts technician if work is of a critical nature
- · When work is completed, technician closes work order
- Reports are produced on a weekly or monthly basis to analyze work requests

This process may be a future application for MDT system automation. MDT access will be required for any interaction or support of the CAD/911 effort.

## ⇒ Current Systems

Operations & Technology has approximately eight (8) hand-held radios in use by field technicians. These 800mhz trunking radios contain two talk groups to provide separation between network and telecom staff. All transmission facilities for these radios are provided through a County Contracted service.

Operations & Technology has made great use of these devices in infrastructure installations, network troubleshooting, and to dispatch field staff without return to the main office facility. The Customer Support Services staff currently do not utilize radios, but this is intended in the future for all field technicians.

#### ⇒ Problems & Concerns

For the last three years, ITS has been fairly satisfied with the leased services and the radios that are in place. The major problem has been the lack of ability to expand use of radios to other staff. In addition, in the last year, the transmission services provided by the contract vendor have degraded significantly.

#### ⇒ Needs and Wants

Both the HELPDESK and field staff need the ability to communicate with the Facilities Management, TNR, and County Clerk offices on occasion. Most traffic, however, will be intradepartmental. Independent talk groups for four divisions are also necessary to isolate troubleshooting efforts.

Radio coverage is desired within the TC Courthouse Complex, all other County Facilities, and on the outside edges of the County.

ITS wants to include 20 portables and 1-2 base stations in the planning for the new system.

## 4.2.12 Travis County Facilities Management Building Maintenance

## ⇒ Agency Organization and Function

The function of the Travis County Facilities Management Building Maintenance Department is to provide community stewardship service related to environmental protection, facility planning, fire safety and life safety. They also coordinate and integrate plans and programs with all other governmental entities. They maintain all County owned buildings, and provide support for most County leased buildings with building maintenance staff, custodial staff, and grounds keeping. The also provide support for elections of setup and delivery of voting equipment, and provide after hour building security to buildings. On average, the Department handles approximately 700 service work orders per month.

## ⇒ Current Systems

The Department currently uses Channel 4 of the radio system of TNR. They presently have 28 hand held radios, 10 truck mounted radios, and 2 base units.

#### ⇒ Problems & Concerns

Low radio signal and very thick walls of the downtown buildings make it impossible to use the current radio system effectively.

#### ⇒ Needs and Wants

With the anticipated growth of staff and the acquisition of more County buildings it will be necessary to have at least 18 truck mounted radios and 45 hand held radios within the next 3 years.

# 4.3 Other Agencies

# 4.3.1 Austin Independent School District

## ⇒ Agency Organization and Function

The Austin Independent School District boundaries extend beyond the City limits of Austin and incorporate portions of Williamson and Hayes Counties. The District operates 68 elementary schools, 15 middle schools/junior high schools, and 11 high schools plus the Johnson High School Science Academy and Liberal Arts Academy. In addition, there are 7 Special Centers, such as the Evening High School and the Alternative Learning Center.

The District is growing at a rate of about 2,000 students per year. Much of the new growth for the Austin Independent School District is in the southwest area of the City and

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County. In addition, there is discussion of possibly taking in other smaller surrounding school districts as part of the AISD.

## **Transportation Department**

The Transportation Department currently operates all AISD school buses. At this time, they operate 361 mobile and 6 portable radios. Remote dispatch points from the Doss Elementary School tower are located at the Transportation Main Office, 111 West 6th Street; the Saegert Bus Terminal, 330 Jones Road; and the Nelson Bus Terminal, 7400 Berkman, all in Austin, Texas.

The forecasted growth in bus radios at the time of system cut-over is for 500 mobile radios and 20 portables, plus a growth of about 2% per year, based on expansion of the District and opening of additional schools. The school buses are also used to evacuate and/or relocate people during disaster situations, e.g., flooding or hurricanes.

#### AISD Campus Police Department

The AISD Police Department's jurisdiction includes any school related incident within the District boundaries, whether on a school campus or not. It also includes any incident requiring immediate police support such as DWI stops in school zones, which would involve notification of the appropriate agency, e.g., Austin Police Department. The Department is occasionally called upon to assist the Austin Police Department if they do not have an available unit or if they are aware that the AISD P.D. is nearby the scene of an incident.

The Campus Police Department has a single radio dispatch position, which is very busy throughout the day. The dispatcher is required to answer incoming telephone calls, manage radio dispatch, operate records keeping computer systems, and run TCIC/NCIC wants and warrants checks. In addition, the dispatch location is also the central monitoring point for all fire and intrusion alarms in school buildings as well as a panic alarm, which is located in each school administrative office.

The Police Department also uses a radio telemetry monitoring system for intrusion and fire alarms in 430 portable classroom buildings (860 classrooms). The system is provided by an outside service company and all alarms terminate at Police Dispatch. The dispatcher is required to verify fire alarms against possible prank alarm calls prior to notifying the Austin Fire Department. However, if a smoke detector activates in an air handler or a fire suppressions sprinkler system is activated, or similar "hard alarm", the dispatcher would contact AFD immediately via a "ring-down" circuit.

The Department currently has a Computer Aided Dispatch and Records Management System. However, it is primarily limited to AISD P.D. operations and activities. This

system is used by the single dispatcher for P.D. who is currently operating from a very antiquated console position.

The Department currently operates 14 mobile and 31 portable radios. They have no Mobile Data Terminals at this time. At system cut-over, the Department anticipates a requirement for 20 mobile radios and 40 portable radios. Future growth to the year 2006 indicates growth to 25 mobiles, and 50 portables.

## ⇒ Current Systems

The AISD currently operates radio systems for four major user groups. These are: the Austin Independent School District Police Department; the Transportation Department, who operates the school buses; the Maintenance Department, who is responsible for maintenance and grounds keeping at all facilities; and a "Hall Monitors" system which includes principals and other staff members at each of the 96 different school facilities. In total, these four operational groups currently utilize about 500 mobile and 500 portable radios, for a total of approximately 1,000 two-way radios.

These departments all operate on four UHF repeater and one VHF simplex channel as follows:

- Channel 1 AISD Campus Police 460.875/465.875
- Channel 2 Hall Monitor Channel 1 463,200/468,200
- Channel 3 Maintenance Department 463.225/468.225
- Channel 4 Transportation/Buses 463.900/468.900
- Channel 5 Second Hall Monitor Channel 151,775

The UHF and VHF transmitters are all located at the Doss Elementary Tower site at 7005 Northledge in Austin.

The AISD Telecommunications Department estimates that the Maintenance Department currently operates approximately 150 mobile radios and 50 portable radios. These are dispatched over the single repeater channel (463.225/468.225) from the Department headquarters on 51st Street. At this location, there is one control station and approximately 12 DC desktop remotes. The Department maintains buildings, grounds maintenance, and general physical plant including air conditioning and heating. There are approximately ten operational groups within the Maintenance Department, which includes electrical, plumbing, HVAC, custodial, grounds, general building maintenance, painters, structural repair, construction, asbestos abatement, and the garage with automotive repair.

The Hall Monitor channels are utilized for both on-campus communication and, on the UHF channel, communication with AISD P.D. and bus transportation. It is estimated that the majority of the VHF portables are currently utilized at the elementary school level, primarily for on-campus communications between school administration personnel. The

Telecommunications Department estimates that there are approximately 200 VHF portables in use by the elementary schools.

Based on the Telecommunications Department's estimate of 15 to 20 UHF portables in operation at each high school, and approximately 10 UHF portables in operation at each junior high school, we estimate that there are about 300 UHF portables currently in use on school campuses. The portables used by high schools and junior high schools allow both on-campus communication as well as direct communication with the AISD P.D. and bus transportation. These quantities are currently only estimated numbers since individual schools frequently purchase their own portable radios for use on campus and the Telecommunications Department has no current inventory of all radios purchased by individual schools.

#### ⇒ Problems & Concerns

The Transportation Department experiences crowded radio channels at peak times. Radio coverage is needed throughout the County and between buses during long field trips.

In addition to in-building coverage for all schools, the Police Department would need coverage extending into Williamson and Hayes County for operation in those areas. Field units would need interoperability with the Austin Police, Austin Fire, Hospital Police, and the Travis County Sheriff's Department. In addition, the dispatcher needs to be able to contact the Williamson County Sheriff's Office, Round Rock Police Department, Pfluegerville P.D., West Lake P.D., Sunset Valley P.D., Mustang Ridge P.D., Lago Vista P.D., Lakeway P.D., Cedar Park P.D., the Austin Park Police, and the Texas Alcohol and Beverage Commission.

#### ⇒ Needs and Wants

In the new trunked system, the Department would like to have three talk groups as follows:

- Channel 1 Dispatch
- Channel 2 Tactical 1
- Channel 3 Tactical 2

In addition, they would need interoperability with the Hall Monitors, Transportation, and Maintenance primary dispatch talk groups.

It is presumed that under a trunked radio system, each of the ten groups within the Maintenance Department require an individual talk group. It is also currently assumed, that the Department would need a minimum of 150 mobile and 50 portable radios at the time of system cut-over.

It is somewhat likely that, due to the acquisition cost of 800 MHz trunked portable radios, the VHF channel would continue to be used by elementary schools for on-campus communication. Decisions will need to be reached regarding interoperability requirements from high schools and junior high schools with the AISD P.D., the Bus Transportation (either AISD buses or Capitol Metro buses), and the Austin Fire Department to determine future required quantities of 800 MHz portables. It is feasible that the VHF channel could be utilized at the high school and junior high school campuses for strictly on-campus radio communications and/or the existing UHF channel (463.200/468.200) could also be maintained for this purpose.

## 4.3.2 Austin Community College

## ⇒ Agency Organization and Function

ACC operates six major campuses and 8 off-site campuses in the Austin area. The ACC Police Department has 29 sworn and 10 safety officers whose duties are primarily to deter crime at the campuses. They respond to security alarms and call EMS as needed for sick or injured persons. Each campus administrative office contacts its officer through portable-to-portable radio contact.

If someone on campus calls 9-1-1, usually the appropriate emergency agency (Police, Fire, or EMS) responds to the campus and does not notify the campus officer that they are coming. ACCPD officers usually do not roam between campuses.

## ⇒ Current Systems

ACCPD has a single repeater at the pinnacle near the Trail of the Madrones and Deer Pass roads just northwest of Mt. Larson. Its antenna is nine stories up on the highest point. The repeater transmits on 461.425-MHz and receives on 466.425-MHz. It is licensed as a "community repeater" although it is unknown if others use the repeater (other entities do use the channel, though). Unit-to-unit communications use the base-transmit frequency in "talk-around" mode.

The Police Department intends to spend \$25,000 on additional handheld radios and a base station during this fiscal year.

#### ⇒ Problems & Concerns

The primary problem is poor radio coverage. Most communications are unit-to-unit, portable-to-portable. The single repeater near Mt. Larson is not adequate for coverage of all of the campuses. From the repeater to Cedar Park is a long path for portable radio coverage. Inter-campus communications is not reliable due to the long distances and single repeater.

Not enough radio equipment is owned to adequately do the job. Many of the radios are inexpensive models such as Uniden, which are problematic and difficult to repair. Also, most of the radios are over seven years old and have reached the point of replacement. It was reported that "the older radios go out daily."

Other entities use the ACCPD channel. It is licensed in the Business Radio Service, which is licensable by any business. There are "too many users" on the channel.

As mentioned above, emergency service agencies responding to the schools do not contact the on-campus officer. Intercommunications with other agencies is non-existent.

No back-up facilities exist.

Since the repeater does not adequately serve the needs of ACCPD, and only "a bunch of handheld radios" are in use, ACCPD has "every problem you can imagine."

#### ⇒ Needs and Wants

ACCPD wants to communicate with the following agencies:

- Austin Police Department
- EMS agencies
- · Austin Fire Department
- · Travis County Sheriff
- Texas Department of Public Safety
- · Water and Electrical providers for on-campus emergencies

# 4.3.3 Capital Metropolitan Transit Authority

# ⇒ Agency Organization and Function

Capital Metro provides Transit Bus Service throughout the Austin area on Fixed Bus Routes, Special Transit Service routes, and operates the University of Texas shuttle. The bus system operates in a 50 mile radius from downtown Austin, including routes in Travis and Williamson County. There are currently 182 fixed bus routes in the a.m. hours, and 185 fixed bus routes in the p.m. hours. There are also 62 Special Transit Service routes which include service in sedan type vehicles. The main administration offices, as well as Vehicle Maintenance facilities, are located at 2910 East 5th Street in Austin.

DAVE Transportation is the Capital Metro contractor for the University of Texas shuttle system. Operating out of a single bus barn located on I-35 at Slaughter Lane, this shuttle

service includes 14 routes. In addition, their contractor operates 3 flyer routes, and 42 AISD routes utilizing 87 passenger buses.

Capital Metro does not have its own Metro Police Department. They use Austin Police Department off-duty officers as transit police. The officers use marked Capital Metro service vehicles. At any time, there are typically three vehicles on the street, which are dispatched by Metro. If an incident occurs on a bus which requires police support, Metro dispatches the off duty APD officer first. If additional assistance is required from APD, the officer on the scene radios back to bus dispatch for assistance. Bus dispatch contacts APD by phone as they have no direct radio communications with APD.

Capital Metro is working in conjunction with the Austin Independent School District to provide transit bus service for students. Metro is currently providing 16 bus routes for students attending Magnet Schools. Metro has future plans to expand AISD service to provide 42 additional routes.

## ⇒ Current Systems

Capital Metro currently operates 441 mobile and 40 portable radios on their 800 MHz radio system. This system currently consists of six conventional 800 MHz channels utilized as follows:

⇒ Channel 1 - Fixed route bus dispatch	(811.2125 / 856.2125)
⇒ Channel 2 - Fixed route bus dispatch	(812.2125 / 857.2125)
⇒ Channel 3 - Special Transit Service	(813.2125 / 858.2125)
⇒ Channel 4 - Supervisor's Radio System	(814.2125 / 859.2125)
⇒ Channel 5 - Special Transit Service	(815.2125 / 860.2125)
⇒ Channel 6 - Dispatch Channel for UT Sh	outtle (leased from City of Austin)

Channel 6 is licensed to the City of Austin and leased by Capital Metro. It is operated by a single GE repeater at the Mt. Larson tower site. The five channels licensed by Capital Metro are all located at a repeater site at the KASE radio tower at 2724B Trail of Madrones, in Austin.

The main dispatch center for the radio system is located at 2910 East 5th Street, in Austin, which is the Metro main office. The dispatchers use three Motorola CentraCom Series II consoles, and two Stat Alert Desk Top consoles. There is a Motorola 4 channel backup base station for this system also located at the KASE radio tower at 2724B Trail of Madrones, in Austin.

In addition to the 800 MHz conventional radio network, there are two radio channels in operation at the maintenance facility. The Shop Supervisors operate portable radios on a simplex VHF hi-band channel which is 156.000. The building Maintenance personnel operate on a simplex UHF channel which is 466.68750. Both systems only utilize two watt

portable radios and there is no base station or tower site for either of the channels. There are a total of 0 mobiles and 22 portables on these channels.

Metro currently runs a silent alarm system on their buses. This silent alarm is activated by the bus operator and the annunciator is at bus dispatch.

#### ⇒ Problems & Concerns

Capital Metro has no current interoperability with APD, AFD, EMS, or TCSO. This capability for interoperability will be required in the new citywide communications system.

#### ⇒ Needs and Wants

Capital Metro is currently developing "smart bus" technology. One component of this technology, (J1708 and J1709) will allow monitoring (by exception) of bus maintenance type functions, e.g., oil pressure alarms, coolant temperature, air conditioning compressor cycling, etc. The system will extract information from buses about every 8 to 10 minutes. Information will be downloaded nightly into the EMPAC maintenance system. New buses contain J1708 backbone to facilitate additional "smart bus" technology. Metro also plans to utilize GPS technology in the near future. New buses arriving over the next year are equipped with Allen Bradley Programmable Logic Controllers which control all electrical functions on the bus. Metro will need Data Transfer capability in order to monitor and adjust operating functions within the coach.

Future growth of the Capital Metro service could include the operation of a rail transit system. Initially, a 30 mile line is planned by the year 2002. Additional rail transit lines could be in place by the year 2006. Future operational needs will include the NW 183 corridor out to FM1431 due to future growth in the area and annexation by the City of Austin.

In the new system, it is anticipated that at cutover, Metro will require 510 mobile radios and 85 portables. Growth forecasts in the year 2000 call for 513 mobiles and 85 portables. Growth to the year 2006 anticipates a need for 580 mobiles and 98 portables.

# 4.3.4 Pflugerville Police Department

## ⇒ Agency Organization and Function

Pflugerville is a small but rapidly growing community north of Austin currently serving a population of 12,500 in a 6.34 square mile area, and an additional 27 square miles in Extra-Territorial Jurisdiction (ETJ). In addition to normal Police Department functions, the Pflugerville Police Department also performs the Animal Control, Street Signs, Community Services, Court Services, and Fire Marshal functions. The department has two

Canine units and two horseback units. There are 23 sworn officers and seven full time civilian dispatchers.

## ⇒ Current Systems

Pflugerville Police Department (PPD) is one of three Primary 9-1-1 PSAPs (Public Safety Answering Points), the others being at the City of Austin dispatch center and Travis County Sheriff's Office. Pflugerville's PSAP handles calls only for the City of Pflugerville, and the Austin and Travis County PSAPs answer 9-1-1 for everyone else in the County.

Usually only one dispatcher is on duty at any time, although sometimes two may be available. There are two dispatch positions in the center, with the radio and CAD shared by the two operators. Each position has separate telephones. The City has two radio channels, one for the Police Department and the other for other City departments, including the Water, Parks and Recreation, Administration, and the Public Works and Inspection Departments.

The current radio frequencies are:

Police 155.415-MHz
 City Water 153.905-MHz

Intercity Police 154.950 & 155.370-MHz

The Police and Water base station radios are located at the water tank. Intercity and a back-up police base are located at the Police building.

#### ⇒ Problems & Concerns

The police radio channel experiences skip interference from South West Texas State University in San Marcos and from El Paso. The Water Department channel hears Texas Power. This interference is compounded by the Police Department's use of scanning receivers, where interference on both channels is heard.

There are a few coverage holes, more for hand held radios, but some also for mobiles. Inside buildings also can be poor coverage locations. Coverage near the treatment plant is poor due to the distance out of the city.

The City wants MDTs, but no frequency is available.

The CAD-to-911 interface is just being installed and is badly needed.

Other agencies have PPD's channel in their radios, and sometimes use it because their own channels are busy, asking PPD to run checks, etc. This is okay (in fact, desirable) for backups and mutual aid, but not good for routine matters.

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Some of the equipment, especially the Water Department's radios, are old and not working well. Radios other than Motorola brand are difficult to get repaired correctly.

Total integration of the telephones and radio consoles is still not available. Dispatchers would like a phone patch and wireless headsets.

The 9-1-1 equipment varies from City to City. PPD needs instruction on programming and using the 9-1-1 phones. There is no single source for information on the 9-1-1 equipment. Even APD needs better training to make transfers consistently the same way

There are three distinct ways to program the speed dialers, with the instruction book being cryptic and not complete in showing steps in programming steps.

New equipment purchases are on hold awaiting the new system.

Back-up radios are available at the PPD, and a generator can be brought in to power the radios, phones, and 9-1-1. No back-up dispatch facility is available. PPD cannot communicate with fire units in the city

#### ⇒ Needs and Wants

Regarding the 9-1-1 system, the City wants all equipment to be purchased off of the same specification for all agencies, and then have a common, uniform method of programming and using the systems.

Wireless headsets are desired to break the tether between the dispatcher and the equipment.

PPD must be able to communicate via radio with other agencies in the area. These include Travis County Sheriff, Williamson County Sheriff, Intercity, Fire Department, and the Water Department.

# 4.3.5 Texas House of Representatives

## ⇒ Agency Organization and Function

The State of Texas Legislature meets for only five months every two years. Legislature support agencies must prepare during the year-and-half off time for the half year period of the Session. During the Session, "time is of the essence" where the legislative bills must be handled quickly. Radio communications are essential to provide these services.

The House of Representatives Security Operations provides security in the House Chamber during the Session. Security also controls parking on the Capital grounds. Security is important to allow the 150 representatives to handle their five-month work load while many visitors, lobbyists, and press visit. Some days can be very long due to the amount of work at hand.

## ⇒ Current Systems

Security uses several channels, all of which are Public Safety splinter, low power frequencies except the primary repeater channel. The House Sergeant-at-Arms uses three channels. Parking and House Property use two other channels. These channels are as follows:

Channel Use	Transmit	Receive	
Primary Repeater	453.3750	458.3750	
Sgt-at-Arms	458.3750	453.3750	
Sgt-at-Arms Direct	453.0625	453.0625	
Parking	453.6625	453.6625	
Property	453.8125	453.8125	

The repeater is located atop the Reagan Building. There are 26 hand-held radios and three base stations. Three more frequencies are available if needed.

#### ⇒ Problems & Concerns

Although no interference is experienced, Security Operations overloads the available channels during the Legislative session. At least three more channels are needed to spread the communications evenly.

Coverage is poor in some areas, especially the Capital Building Extension, which is four floors underground.

Intercommunication with Texas DPS and Austin Fire and EMS is not possible.

Some radios are old and are nearing the age of replacement. They need frequent repairs.

The repeater does not have back-up electrical power.

#### ⇒ Needs and Wants

Three more channels are desired: House Speakers office, House Administration, and Emergencies/ Special Operations. This would bring the total to eight channels.

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Security would like to talk with the DPS personnel patrolling the Capital Complex and monitor the City of Austin Fire and EMS radio traffic.

The Senate Sergeant-at-Arms also needs similar radio operations for their Property operations.

Security hopes to narrow-band their systems in the future to meet the FCC laws.

## 4.3.6 Texas Legislative Council

## ⇒ Agency Organization and Function

The State of Texas Legislature meets for only five months every two years. Legislature support agencies must prepare during the year-and-half off time for the half year period of the Session. During the Session, "time is of the essence" where the legislative bills must be handled quickly. The Legislative Council Information Systems Division provides computer system support for the House of Representatives and Senate. Radio is used to expedite services and repair systems quickly. During the off times, systems are updated and expanded for the next session, and systems are tested. Radio communications is essential to provide these services.

## ⇒ Current Systems

Radio communications is used primarily in the area bordered by 9th Street, 18th Street, Lavaca Street, and Trinity Street, which is the Capitol complex area.

The Information Systems Division operates a repeater located atop the Reagan Building. It transmits on 453.8625-MHz and receives on 458.8625-MHz. The repeater is on UHF splinter channels which are licensed as mobile stations with output power limited to 2 watts. The 453.8625-MHz channel and 453.1625-MHz are used for direct portable-to-portable communications.

The buildings serviced by Information Systems are provided emergency services by the Texas DPS for police services, and by the City of Austin Fire Department and EMS. These agencies need radio coverage in the buildings.

#### ⇒ Problems and Concerns

There are several radio dead spots in the buildings. Worst of all is the four story underground building under the 14th Street and Congress Street intersection. Information Services and all other agencies need radio coverage throughout that structure.

Intercommunications with other Capitol Complex agencies and City emergency departments is not possible at this time.

#### ⇒ Needs and Wants

Better coverage and interagency communications are desired. More channels are also desired to allow more simultaneous troubleshooting and testing communications.

800 or 900 MHz is desired to allow more channels and to pipe all agencies radio signals into the underground building. Trunked talk-groups and talk-around will permit better use of radios for work of the Division.

Additional and replacement equipment will be needed by the time the new system is ready.

## 4.3.7 University of Texas

## ⇒ Agency Organization and Function

The University of Texas campus covers an area generally from 15th Street north to 27th Street west of I-35 and operates a number of facilities on the east side of I-35 including the Central Receiving Building, the Printing and Press Building, and the Physical Plant Complex. The three major users of radio equipment on the campus are Physical Plant, Utilities, and the University of Texas Police Department.

The City of Austin provides fire suppression and emergency medical services on the campus, while the University of Texas Police Department provides police protection. UT P.D. also monitors all building fire alarms. Anytime Austin Fire or EMS are called to campus, the UT P.D. provides escort services to the desired location. Campus telephone service is provided by a University-owned and maintained SL-100 PBX (manufactured by Nortel, formerly Northern Telecom). The campus telephone user has two choices for 9-1-1 calls. If they dial 9-1-1 directly, they are connected to the UT P.D. dispatcher, if they dial 9-9-1-1, then they are connected to the City of Austin Primary PSAP (COA PSAP) at APD. Calls to 9-1-1 (UT P.D.) currently convey no ANI/ALI information, although there are plans to provide this capability. If a call to 9-9-1-1 (COA PSAP) originates from a residence hall telephone, either in a student room or a common area, then ANI/ALI is provided to the PSAP. Calls originating elsewhere convey no ANI/ALI information at present. Pay telephones on the campus are provided by Southwestern Bell Telephone and 9-1-1 calls go directly to the COA PSAP. The UT Administration has expressed an interest in having all 9-1-1 calls originating from the campus go to a PSAP at the UT P.D., with all appropriate ANI/ALI system so the call could then be easily "handed off" to the appropriate responding agency.

## ⇒ Current Systems

The University currently operates 50 mobile and 300 portable radios on a variety of VHF hi-band and UHF radio channels.

The channels currently in operation are as follows:

- UT P.D. Primary repeater 154.77/155.58
- UT P.D. Secondary 155.82 Simplex
- Utilities/Physical Plant repeater 155.895/158.925
- Utilities/Physical Plant 158.925 Simplex
- Utilities/Physical Plant 467.90 Simplex
- PAC Repeater 453,95/458,95
- Utilities Communications 151.655 Simplex
- Utilities Communications 151.715 Simplex
- Utilities Communications 151.865 Simplex

#### ⇒ Problems & Concerns

The existing systems suffer from severe channel congestion, especially on the Utilities/Physical Plant repeater. In addition to excessive radio traffic, there is also poor radio protocol and "horse-play" tying up the channel. This type of problem can be quickly resolved in an 800 MHz trunked radio system since each radio I.D. is identified at the time of communication.

The system suffers from inadequate coverage in a number of areas. Currently, these include, Baur House, the Training Academy/Shooting Range, Piasano Ranch, and the Brackenridge Research facility which are not on major UT campuses.

On the UT campuses there are a number of buildings, which currently suffer from very poor coverage on the existing VHF and UHF systems. The J. J. Pickle Research campus, located at the intersection of Burnett Rd. and Braker Lane off the Mo Pac Expressway generally has no handheld coverage due to its remote distance from the transmitters located at the main campus. As an exception, the UTPD primary channel employs a remote receiver to enhance handheld coverage.

The UT P.D. primary repeater channel suffers from significant interference problems. One of these is related to the the UT P.D. transmitter in Houston as both systems use the same tone PL squelch code.

Much of the existing radio equipment is outdated in terms of the average anticipated life of radio equipment. For example, the UT P.D. simplex base station and backup radios for both primary and secondary channels are approximately 25 years old.

#### ⇒ Needs and Wants

The Main Campus also has a number of buildings where communications are currently difficult with the transmitter sites located on the campus. The buildings which should be especially noted in the design of the new 800 MHz trunked system include:

- · L. Theo Bellmont Hall (Bel)
- Engineering and Science Building (ENS)
- Engineering Teaching Center (ETC)
- Fine Arts Library and Administration Building Complex (FAD, PAC, MRH)
- LBJ Library (LBJ)
- The Main Building (MAI)
- Robert Lee Moore Hall (RLM)
- The Union Building (UNB)
- · Erwin Center and UT system Police
- Jester Dormitory
- Cooling Station #2
- UT Tunnels

There are three buildings on the PRC campus to which particular attention should be paid in the design of a new system. These house the following (hazardous materials are used in facilities marked with \*):

- The Applied Research Laboratory\*
- Micro Electronic & Engineering (MER)\*
- · Center for Electro-Mechanics (EME)\*
- Nuclear Engineering Teaching Lab (NEL)\*
- Bureau of Economic Geology (BEG)
- The Commons Building

Current coverage problems would likely be eliminated in the new system since its design criteria will be to provide handheld radio coverage throughout and beyond Travis County.

If UT P.D. in Austin is on the new 800 trunked system, the interference problems with UTPD in Houston and other sources will disappear.

# 4.3.8 West Lake Hills Police Department

## ⇒ Agency Organization and Function

West Lake Hills is a community of 2,700 people in a four square mile area west of Austin. West Lake Hills Fire performs some specialized operations like high angle rescue. Fire has some 20-25 full time and 20-25 volunteer personnel, although only about four full time

fire fighters are on duty at any one time. West Lake Hills Police Department uses other agencies for special operations, such as SWAT functions. The Police hope to establish a mobile command center to secure and contain the scene until APD SWAT or other agencies arrive on scene.

West Lake Hills Police Department provides dispatch services for the City's Police Department, Fire Department, and Emergency Medical Services. It serves as a secondary PSAP for emergency calls in the City (these are calls that are transferred from Austin's 9-1-1 PSAP). There are differences between Austin's and West Lake Hills' CAD maps and some calls are mis-dispatched for the wrong agency. These maps are currently being reconciled for improved accuracy.

## ⇒ Current Systems

The dispatch center has one Motorola CentraCom II console that is seven years old. A Dictaphone logging recorder and two Dictaphone instant recall recorders are used. There are also two 9-1-1 call taker positions.

The Police repeater is located at 6304 Bee Cave Road in Austin. Intercity base and fire control station equipment is located at the Police dispatch building. The Fire repeater is located at the National Guard Armory on Bee Cave Road.

West Lake Hills Police Department has ten mobile radios and 18 portable radios, primarily using four VHF channels. Radios are programmed with the following channels:

Channel	Frequency (MHz)	Channel Use
Channel 1	154.085	TCSO Channel 1
Channel 2	153.935	TCSO Channel 2
Channel 3	155.910	Police Repeater (input 155.115)
Channel 4	155.115	Police Repeater (output 155.910
Channel 5	154.950	
Channel 6	155.370	Intercity car-to-car
Channel 7	153.980	Intercity car-to-base
Channel 8	154.845	West Lake Fire/EMS
Channel 9	155.715	TCSO Channel 6
Channel 10	155.290	EMS
Channel 11	154.680	Rollingwood
Channel 12		DPS mobile receive

#### ⇒ Problems & Concerns

The dispatchers and field units monitor several channels and suffer from what the City calls "attention congestion" where it is hard to keep track of traffic intended for a given unit.

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# SECTION 5.0

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## 5.0 RADIO COVERAGE REQUIREMENTS

## 5.1 Required Coverage

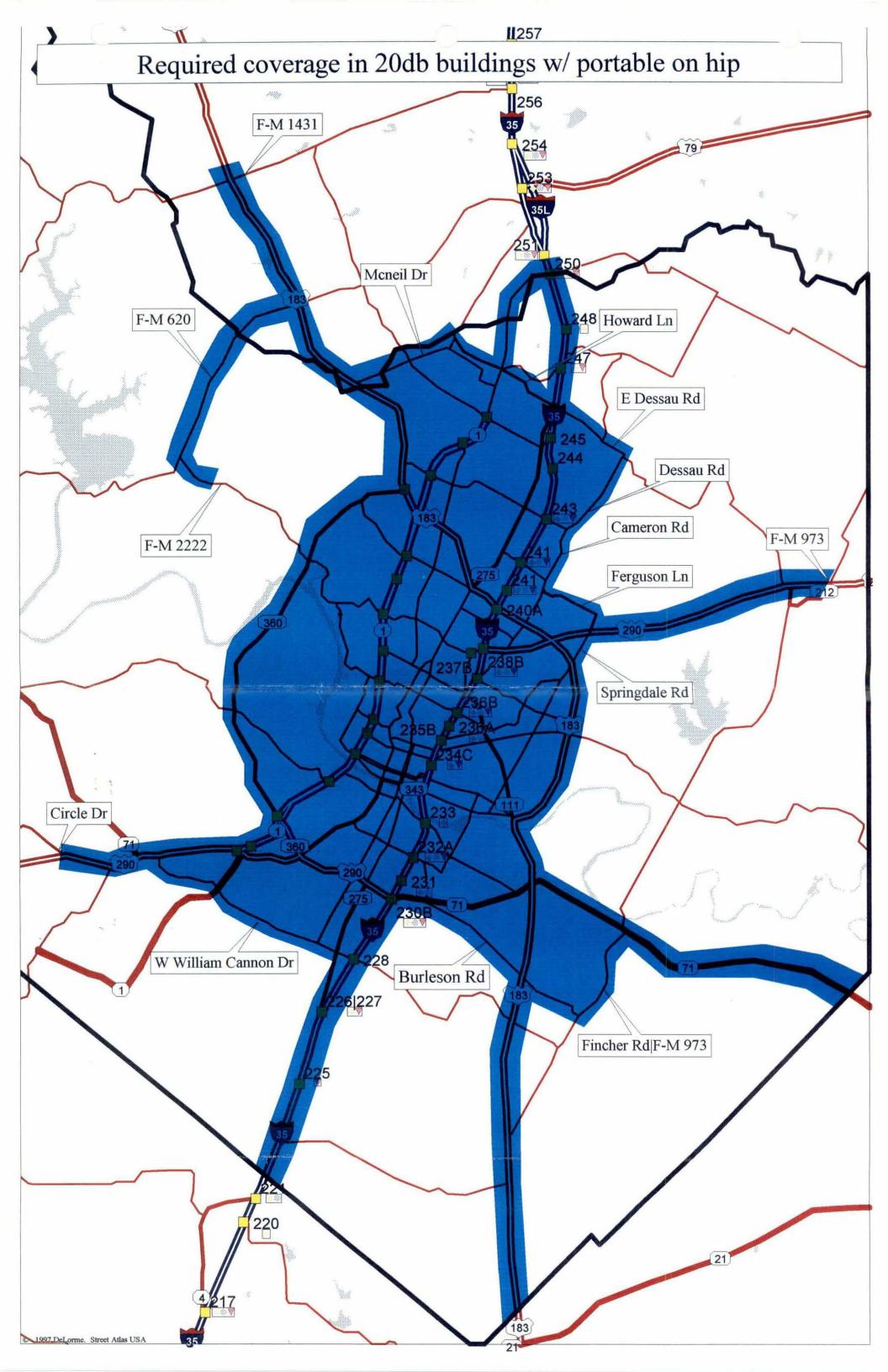
The required radio coverage area has been defined in the maps on the following page. As can be seen in the required coverage map, the Coalition requires extensive portable radio coverage inside buildings, and beyond Travis County lines.

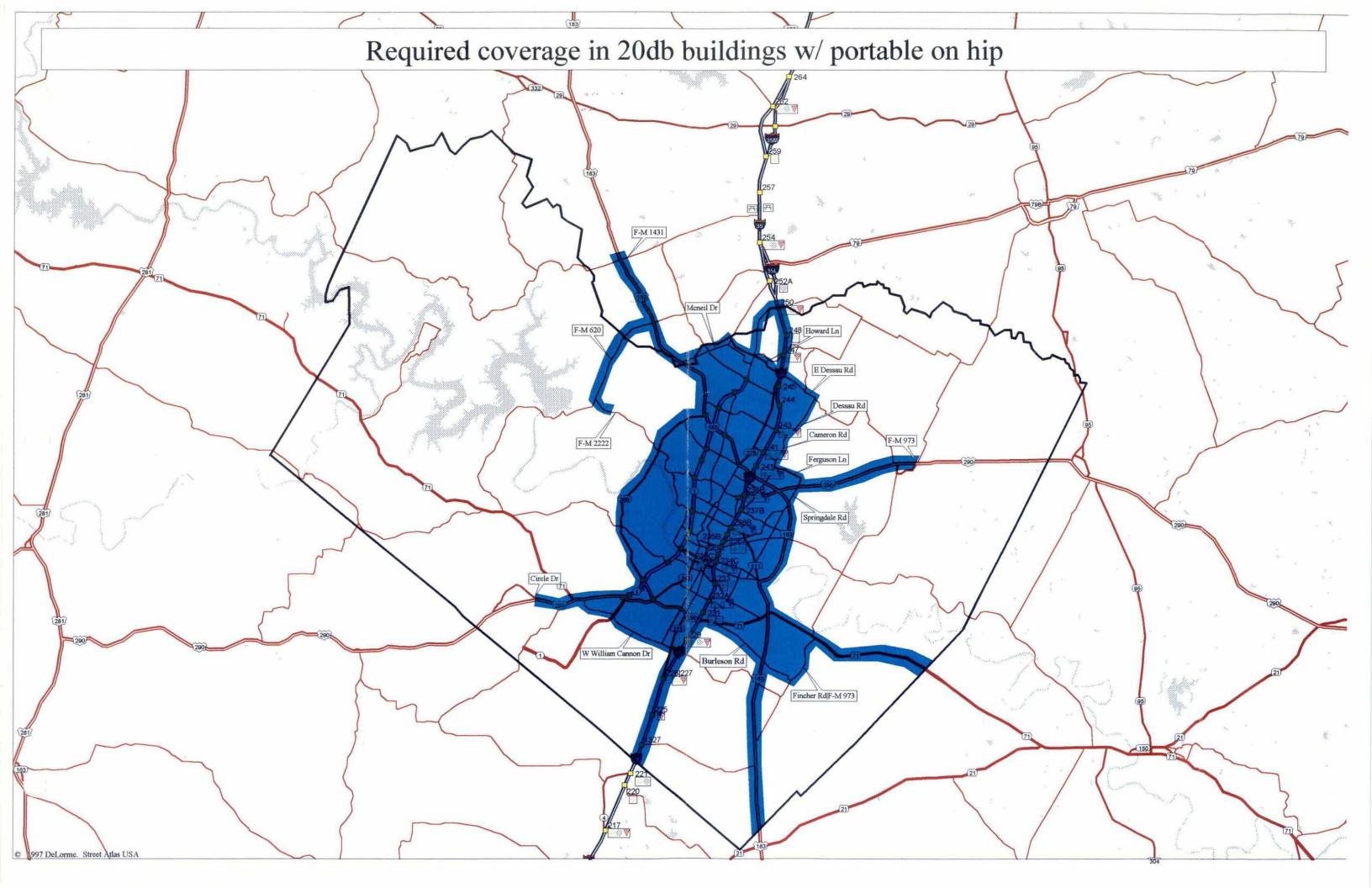
The combined trunking system will need to cover all of Travis County, all of the incorporated areas of the City of Austin that fall outside of the County boundaries, all of the Austin Independent School District, and the Capital Metro service area, which operates in a fifty mile radius of downtown Austin. This service area extends into portions of Hays County to the south and Williamson County to the north. The City of Austin/Travis County EMS system provides transport of patients to hospitals in neighboring counties, such as Round Rock Community Hospital. In addition, since City and County law enforcement agencies routinely operate beyond the County lines in neighboring counties, mobile coverage is required far beyond the geographic boundaries of Travis County.

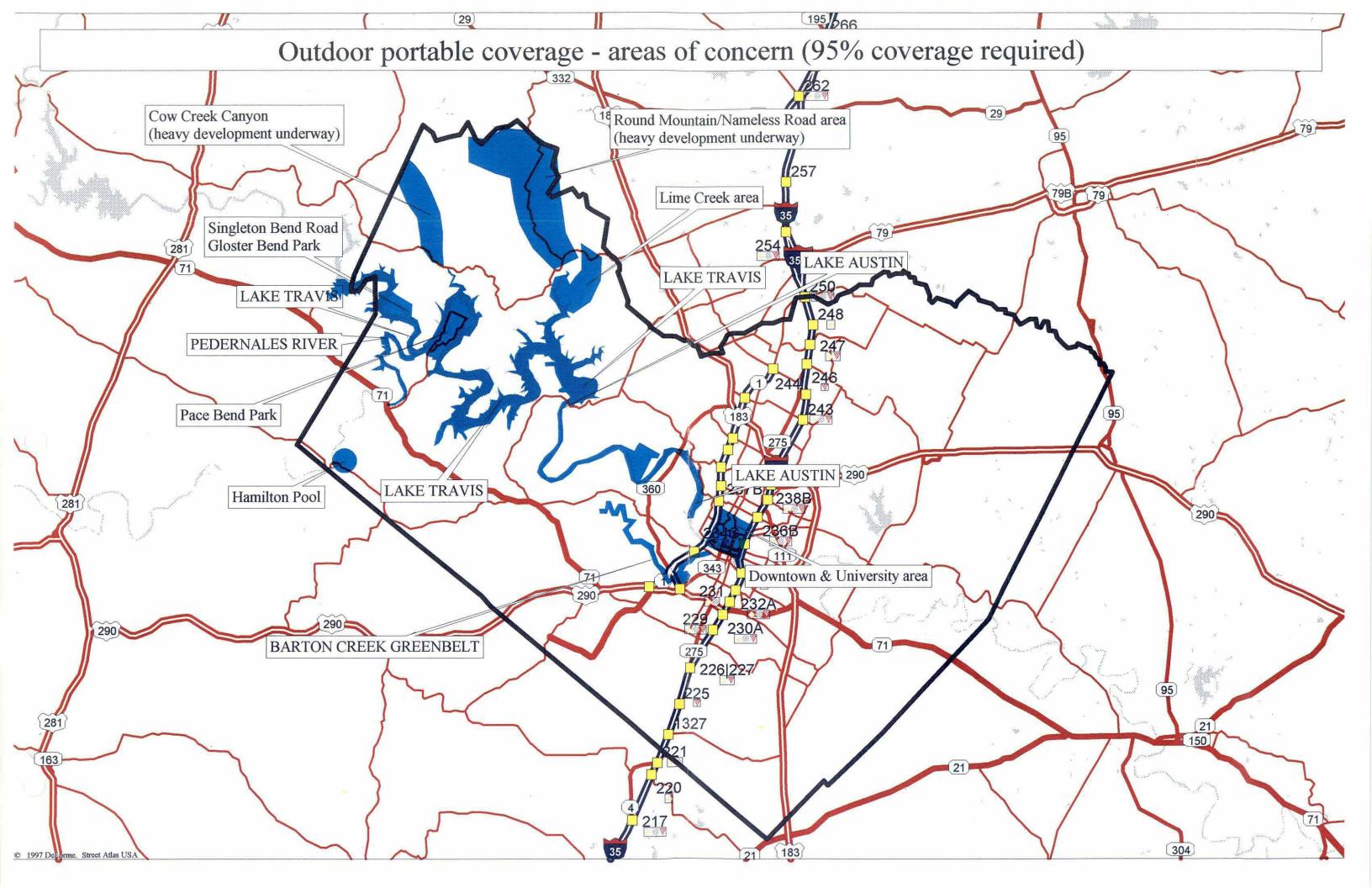
The unique topography of Travis County presents certain system design challenges. Eastern Travis County is generally open countryside, with gently rolling terrain. The center of Travis County includes the urban I-35 corridor, with greater building density and larger buildings. The heart of this region is downtown Austin, including the UT campus, the Capitol office complex, large hotels, and office buildings.

West of Austin rises the Balcones Escarpment, which marks the beginning of the Central Texas Hill Country, with its sharply defined river canyons and lake country. The hill country immediately west of Austin includes several of the more affluent suburbs of Austin, and is a region of continued growth. The Colorado River flows through this area, and leads to Lake Travis, a popular recreational area. Many creeks and drainages wind through the limestone of the area, forming narrow canyons on their way to the Colorado. Barton Creek is one example, which flows through Southwest Travis County, cutting through the Gus Fruh green belt, through Zilker Park and the Barton Creek Pool, ultimately joining the Colorado at Town Lake, in downtown Austin. Rescue personnel have experienced difficulty communicating while along the creek in the canyon bottom. All of these terrain irregularities have an impact on radio coverage which must be accounted for when developing a new system.

The Pedernales River, in far west Travis County, forms a similar canyon, and rescue personnel will require communication near popular swimming holes of that area, such as Hamilton Pool.







Lake Travis snakes through canyon walls for 40 miles from the county line to the Mansfield Dam. The Colorado River then runs through Lake Austin, through an even narrower and deeper canyon, before flowing through Town Lake. Its length, along with its many twists and turns, will make it difficult to cover without several sites.

Reliable in-building radio coverage is required by the agencies that serve the City of Austin and Travis County. Coverage is required inside many large buildings, such as AISD schools, hospitals, and City and County Jails. Downtown coverage will be required by Public Safety personnel in downtown buildings such as those listed in Paragraph 5.1.1.3 following.

Austin is known for its high-tech industries and research facilities. Coverage is desired in many large complexes such as semiconductor and computer plants, and research facilities. The Austin area includes several large shopping malls and many smaller retail shopping centers. Coalition agencies will require communications inside some of these facilities as well. Lakeline Mall is one of the newer malls in the area. It lies within the Austin city limits several miles north of the Travis County line in Williamson County, and could pose communications challenges for Coalition personnel.

## 5.1.1 Coverage Definition

Coverage is defined as the minimum usable signal required to produce a clearly readable voice signal, without repetition or any missed syllables. Coverage is required for analog, digital, and digitally encrypted modes of operation.

All references to coverage reliability in this document refer to area reliability. For example, the phrase "95% coverage" indicates that 95% of the total area described shall exhibit reliable coverage. However, it will not be acceptable to provide a design which includes a large number of failed points in one vicinity, while still meeting the overall coverage reliability goals.

## 5.1.1.1 General In-Building Coverage

In general, the maps indicate that area-wide coverage is required for mobiles, portables on street at belt level, and portables worn on the belt inside standard buildings. Standard buildings are defined as buildings with 10 dB of penetration loss or less. Coverage is also required in heavy buildings for portables with a flexible antenna held at head level. Heavy buildings are defined as buildings with 20dB of penetration loss or less.

## 5.1.1.2 In-Building Coverage

Coverage is also required for portables worn on the belt within heavy buildings, defined as buildings with 20 dB or less penetration loss, within an area outlined by the following roads & streets, plus an additional 1/4-mile outside of the area encircled by the following roads and streets:

- E. on Ben White Blvd. from I.H. 35;
- SE. on Burleson Rd. to FM 973;
- NE. on FM 973 to State Highway 71 (Bastrop Hwy.);
- W. on State Highway 71 to US 183;
- N. on U.S. 183 (Ed Bluestein Blvd.) to Springdale Rd.;
- N. on Springdale Rd. to Ferguson Ln.;
- E. on Ferguson Ln. to Cameron Rd.;
- NE. on Cameron Rd. to Dessau Rd. (Cameron Rd. becomes Dessau Rd.);
- NE. on Dessau Rd. to E. Dessau Rd.;
- W. on E. Dessau Rd to Howard Ln. (E. Dessau Rd. becomes Howard Ln. at I.H. 35);
- NW. on Howard Ln. to McNeil Dr.;
- SW. on McNeil Dr. to U.S. 183 (Research Blvd.);
- S. on U.S. 183 to Loop 360 (Capitol of TX Hwy.);
- S. on Loop 360 to Loop 1 (MOPAC Expressway);
- SW. on Loop 1 to U.S. 290;
- W. on U.S. 290 to W. William Cannon Dr.;
- E. on W. William Cannon Dr. to I.H. 35;
- N. on I.H. 35 to Ben White Blvd.

The required coverage in 20db buildings to portables at hip level shall also include the following corridors to serve as extensions out from the encircled area to include an additional ¼ mile on each side of the identified corridors:

- I.H. 35 S. to the Travis/Hays County Line
- State 71 E. to the Travis/Bastrop County Line
- U.S. 290 E. to FM 973 (the portion which runs N. from U.S. 290 E. of Manor, TX)
- I.H. 35 N. to the Travis/Williamson County Line

- Loop 1 N. (Burnet Rd./FM-1325) to I.H. 35
- U.S. 183 N. (Research Blvd.) to FM-1431 (in Cedar Park, TX)
- FM-620 S. from U.S. 183 to FM-2222
- FM-2222 W. to FM-620

## 5.1.1.3 Mandatory In-Building Coverage

In-building coverage is also required within the following 160 specified facilities within the Coalition service area. Coverage within each of these buildings is MANDATORY. The location of each of these buildings is depicted on a "D" size map that will be provided to proposers at the Proposers' Conference. Proposers shall design their system so that reliable coverage is provided in each building, or shall include other solutions, such as Bi-Directional Amplifiers (BDA's) with distributed antenna systems, in their proposal. Such solutions shall be treated as part of the system infrastructure for evaluation purposes. Reliable coverage from a nearby site is greatly preferred to a BDA solution. Unless otherwise noted, building coverage includes stairways an stairwells, but does not include basements and elevators.

## Mandatory Building List

1.	ACC	5930 Middle Fiskville
2.	ADMC - ER	12221 N. Mopac
3.	APD Headquarters	715 E. 8th St.
4.	Austin Convention Center	500 E. Cesar Chavez
5.	Barton Creek Mall	2901 Capitol of Texas Hwy.
6.	Bellmont Hall	21st St. and San Jacinto
7.	Brackenridge Hospital - ER	601 E. 15th St.
8.	Columbia St. David's South Hospital - ER	901 W. Ben White
9.	Federal Building	8th and Trinity
10.	Frank Erwin Center	1701 Red River
11.	Highland Mall	6001 Airport Blvd.
12.	Jester Center	21st and Speedway
13.	Lakeline Mall	11220 Lakestop Blvd.
14.	LBJ Library	2300 Red River
15.	LBJ State Office Building	1701 Brazos
16.	Municipal Annex	301 W. 2nd St.
17.	Municipal Building (City Hall)	124 W. 8th St.
18.	Municipal Court	700 E. 7th St.
19.		800 Barton Springs Rd.
20.	Pickle Research Center	10100 Burnet Rd
21.	Seton Hospital - ER	1201 W. 38th St.

22.	St. David's Hospital - ER	915 E 32nd, St.
23.	State Capitol Building & Extension &	12th. and Congress/1400 Congress
	Underground Complex	Ave.
24.	The Main Library and University Tower	24th St. and Whitis Ave.
25,	Town Lake Center	811 Barton Springs
26.	Travis County Courthouse	1000 Guadalupe St.
27.	Travis County Courthouse Annex	1010 San Antonio St.
28.	Waller Creek Center	625 E. 10th St.
29.	Welch Hall	105 E. 24th St.
30.	Fire Station 1 / AEMS Medic 06	401 E. 5th St.
31.	Station 2	506 W MLK Blvd
32.	Station 5	1201 Webberville Rd.
33.	Station 8 / AEMS Medic 07	8989 Research Blvd.
34.	Station 16	7000 Reese Ln
35.	Station 17	4128 S. 1st. St.
36.	Station 24	5811 Nuckles Crossing
37.	Station 25 / AEMS Medic 10	5228 Duval Rd.
38.	Station 26	6702 Wentworth
39.	Station 27 / AEMS Medic 11	5401 McCarty Ln
40.	Station 31	5507 FM 2222
41.	Station 34	10041 Lake Creek Parkway
42.	Station 36 / AEMS Medic 15 / Police South Sub Station	500 Ralph Ablanedo
43.	Station 37	8700 Hwy 71 West
44.	AFR Bergstrom	3300 Johnson Road
45.	AFD Headquarters	1621 Festival Beach Road
46.	City Jail / Central Booking	700 E. 7th St.
47.	County Jail	500 W. 10th St.
48.	New Airport Terminal at Bergstrom	?
49.	Engineering Teaching Center	204 E. 26th St.
50.	UT Student Union Building	4 West Mall
51.	The Applied Research Laboratory	10000 Burnet Rd.
52.	Seton Northwest - ER	11113 Research Blvd.
53.	Anderson High School	8403 Mesa
54.	Austin High School	1715 W. Cesar Chavez St.
55.	Bailey Middle School	4020 Lost Oasis Hollow
56.	Bedichek Junior High School	6800 Bill Hughes Rd.
57.	Bowie High School	4103 Slaughter Ln.
58.	Burnet Middle School	8401 Hathaway Dr.
59.	Covington Middle School	3700 Convict Hill Rd.
60.	Crockett High School	5601 Manchaca Rd.
61.	Dobie Middle School	1200 Rundberg Lane
62.	Fulmore Middle School	201 E. Mary
63.	Johnson (LBJ) High School	
		7309 Lazy Creek Dr.
64.	Johnston High School	1012 Arthur Stiles Rd.
65.	Kealing Junior High School	1607 Pennsylvania Ave.
66.	Lamar Middle School	6201 Wynona Ave.
67.	Lanier High School	1201 Peyton Gin Rd.
68.	Martin Junior High School	1602 Haskell St.

69.	McCallum High School	5600 Sunshine Dr.
70.	Mendez Junior High	5106 Village Square
71.	Murchison Middle School	3700 North Hills Dr.
72.	O Henry Junior High	2610 W. 10th St.
73.	Pearce Middle School	6401 N. Hampton Dr.
74.	Porter Middle School	2206 Prather Ln.
75.	Reagan High School	7104 Berkman
76.	Travis High School	1211 E Oltorf
77.	Webb Middle School	601 E. St Johns Ave.
78.	Burger Center Gymnasium	3200 Jones Rd.
79.	Saegert Bus Terminal	7104 Berkman Dr.
80.	Decker Power Plant	8003 Decker Lane
81.	Travis County West Annex	1101 Nueces
	UT Police Station	2201 E. Campus Dr.
83.	Curruth Administration Center	1111 W. 6th St.
	Nuclear Engineering Lab	UT?
_	Austin State Hospital Bldg. 784	4110 Guadalupe
_	Dobie Mall & Hi Rise	2020 Guadalupe
_	Four Seasons Hotel/San Jacinto Center	98 San Jacinto Blvd.
_	Hilton Hotel	6000 Middle Fiskville
	Holiday Inn	IH 35 and Town Lake Rd.
	Hyatt Regency Hotel	208 Barton Springs Rd.
_	IBM	11400 Burnet Rd
92.	IBM	11501 Burnet Rd #902,904,906
93.	Marriott Hotel	701 E. 11th St.
94.	Medical Park Tower	1301 W. 38th St.
_	Omni Hotel	700 San Jacinto
	Omni Hotel	4140 Governors Row
97.	One Commodore Plaza	800 Brazos
	One Texas Center	505 Barton Springs Rd.
	Pinnacle Building	7840 Hwy. 290 West
100	R.L. Moore	2518 Speedway
101	Radisson Hotel	111 E. Cesar Chavez
$\overline{}$	RBJ Building	15 Waller St.
103	Reagan Building	15th and Colorado
	Sam Houston Building	201 E. 14th St.
105	Sheraton Hotel	500 N. IH 35
	Shoal Creek Hospital	3501 Mills Ave
_	Specialty Hospital of Austin	4201 Burnet Rd.
	Stephen F. Austin Building	1701 Congress
_	Stokes Office Building	11th and Guadalupe
_	Supreme Court Building	14th and Congress
	Two Commodore Plaza	206 E. 9th St.
	U.S. Courthouse	8th and Colorado
	Westminster Manor	4100 Jackson
$\overline{}$	William B. Travis Building	1700 Congress
	William B. Clements State Office Bldg.	300 W. 15th St.
116	Education Building @ UT	1912 Speedway

117 Fi	ne Arts Library & Adm Bldg Complex	2301 Trinity
	otorola East	3501 Ed Bluestein Blvd.
119 M	otorola - Oak Hill	6501 William Cannon Dr.
120 Ti	racor	6500 Tracor Ln.,
121 A	MD Main	5900 E. Ben White Blvd.
122 A	MD Fab Buildings 1,2, & 4	5204 Ben White Blvd.
123 A	MD - Lockheed	6800 Burleson Rd.
124 Fi	re Prevention / MedOps	517 S. Pleasant Valley
125 A	rbor	5301 Duval
126 St	oney Bridge Health Center	11127 Circle Dr.
127 T	ne Renaissance	11279 Taylor Draper
128 G	racy Woods Nursing Center	12921 Metric Blvd.
129 H	eartland Health Care Center	11406 Rustic Rock
30 Pf	lugerville Care Center	506 S. Heatherwilde Blvd
131 D	el Valle Correctional Complex	3614 Bill Price
132 A	EMS Medic 01	3616 S. First St
133 A	EMS Rescue 03	1305 Red River
134 A	EMS Starflight	1305 Red River
	EMS Medic 05	5710 N. Lamar
36 D	el Valle High School	2409 Shepard Lane
37 Jo	hn B. Connally High School	13212 N. Lamar Blvd.
38 La	ake Travis High School	3322 FM 620
	anor High School	10305 Hwy 290 East
	cNeil High School	5720 McNeil Rd.
	lugerville High School	Hwy 1825 Pflugerville
	estlake High School	4100 Westbank Dr.
	estwood High School	12400 Mellow Meadow Dr.
_	rboretum Hirise	9736 Great Hills Tr.
45 B	ank One Texas	13809 Research Blvd.
	rst City Center	823 Congress
	anklin Plaza	111 Congress
	ation's Bank Tower	515 Congress
	ne American Center	600 Congress
	ne Hundred Congress	One Hundred Congress
	om C. Clark Bldg.	205 W. 14 <sup>th</sup>
	ice Daniel Bldg.	209 W. 14 <sup>th</sup>
	nployee's Retirement Bldg.	1801 Brazos
_	exas Workforce Commission	101 E. 15 <sup>th</sup>
_	mes Rudder Bldg.	1019 Brazos
	C. Greer Bldg.	125 E. 11 <sup>th</sup>
	mes H. Starr Bldg.	111 W. 6 <sup>th</sup>
158 Te	exas Department of Public Safety –	5805 N. Lamar
	ardner-Betts Juvenile Facility	2515 S. Congress
	obert E. Johnson Bldg.	1501 Congress

## 5.1.1.4 Portables in Underground Facilities

A number of locations exist in Coalition facilities where handheld coverage in below ground facilities in critical. Proposers shall design their system so that reliable coverage is provided in each of the facilities listed below, or shall include other solutions, such as Bi-Directional Amplifiers (BDA's) with distributed antenna systems, in their proposal. Such solutions shall be treated as part of the system infrastructure for evaluation purposes. Reliable coverage from a nearby site is greatly preferred to a BDA solution.

- University of Texas at Austin Utility Tunnels
- State of Texas Capital Complex Underground Office Complex
- Walnut Creek Water & Wastewater treatment plant
- City of Austin Downtown Electrical Vaults (Utility tunnels)
- Texas Department of Public Safety State Emergency Operations Center

# 5.1.1.5 Critical Outdoor Coverage Areas

A number of locations exist throughout the County where handheld coverage is critical. These areas include greenbelts and waterways that run through canyon bottoms, and are likely to include inadequate coverage if not given special attention. These areas must have 95% reliable coverage as individual regions, and may not be ignored as the 5% of the area that goes uncovered by the system.

These critical areas include:

- Downtown & University area
  - Area bounded by Town Lake on the south, IH-35 on the east, 30<sup>th</sup> Street on the north, and Loop 1 (Mopac) on the west
  - Coverage to include all surface streets within the defined area and the University of Texas campus
- · Lake Austin
  - From Mansfield Dam to Tom Miller Dam
  - Coverage to include surface area of the water and all property within 300' of the river bank

#### Lake Travis

- From Mansfield Dam to ¼ mile past Travis County boundary, including all major coves and tributaries
- Coverage to include surface area of the water and all property within 300' of the banks

#### Pedernales River

- From US Highway 71 to Lake Travis
- Coverage to include surface area and all property within 300' of the banks

#### · Barton Creek Greenbelt

- Along Barton Creek from Hebbingston Hollow to Town Lake
- Coverage to include the creek bed and hike/bike trails along and adjacent to the creek

#### Hamilton Pool Park

 Coverage to include all of the Park property, especially the area beneath the overhang by the pool

## Cow Creek Canyon

- Cow Creek Road from FM-1431 to the Travis County boundary.
- Coverage to include the road and all structures within ½ mile of the roadway

## · Singleton Bend Road and Gloster Bend Park

- Singleton Bend Road from Post Oak Road to Singleton Bend East Road
- Gloster Bend Park to include the area from Singleton Bend East Road, following the lake around to Blue Cove Road and an area ½ mile from the river bank

## Pace Bend Park

- Area encircled by FM-2322 and Grisham Trail
- Coverage to include entire park

#### Round Mountain/Nameless Road area

- From FM-1431 along Nameless Road to and along Round Mountain Road to the Travis County boundary
- Coverage to include the roadway and major subdivisions along the roadway

## 5.2 Coverage Testing

Coverage testing shall be extremely thorough and stringent. The following tests shall be performed to verify coverage performance:

#### Portable

- On-Street Voice Quality Tests
  - Throughout Service Area
  - Critical Areas
- In-Building Voice Quality Tests
  - Mandatory buildings
  - Random buildings with up to 20 dB of penetration loss
  - Random buildings with up to 15 dB of penetration loss
  - Random buildings with up to 10 dB of penetration loss

## Mobile

- Signal Strength Measurement Test
- Voice Quality Test

Coalition representatives will supervise the entire test. Coverage will be measured and verified for both talk-in and talk-out. Extrapolation of results from tests in one direction to reach conclusions about the other direction will <u>not</u> be acceptable.

Voice quality tests will be conducted for both analog and digital voice modes. Digital voice testing will be done using the encrypted mode. Radio units of the type being purchased by the various agencies will be utilized during the tests.

For test purposes, the Coalition service area shall be divided into uniform square grids of 1 mile x 1 mile in area. This will result in roughly 1,200 locations uniformly distributed throughout the Coalition service area.

The grids within the critical areas shall be divided into uniform square grids of 1/4 mile x 1/4 mile in area, to provide better testing resolution in the downtown area. These areas will be treated as separate testing areas, where 95% reliable coverage shall be required for each test category.

The Coalition and contractor will test coverage in all accessible grids. Grids that are not accessible by the Coalition shall not be counted in the reliability calculation.

Each test team shall consist of six people:

#### Base Team

- Dispatcher Provided by Coalition
- Test Monitor Third party, such as a consultant
- Record Keeper Provided by Contractor

#### Field Team

- Driver Provided by Coalition
- Test Monitor Provided by Contractor
- Record Keeper Provided by Coalition

To reduce the time required for the coverage test, more than one test team may operate at a time.

A test vehicle shall be provided by the Coalition for each field team. The vehicle will be equipped by the Contractor with a test radio from the stock to be supplied to the Coalition, along with any test instrumentation required.

The Vendor must present the design for all test instrumentation to the Coalition for approval prior to starting the test. The Coalition reserves the right to disapprove any instrumentation or procedures. The Vendor has sole responsibility to provide instrumentation and procedures that are acceptable to the Coalition. During these tests, the mobile relay base station output power shall be monitored and no adjustments made to the mobile relay, mobile unit, portable unit or test instrumentation after appropriate calibration of all units.

# 5.3 Portable Radio Coverage Testing

For the portable voice test, the Coalition and contractor shall test coverage in all accessible grids. Grids that cannot be accessed will not be counted in the reliability calculation. In addition, in-building tests shall be made in random buildings and in all buildings included in the "required buildings list" in this document.

The portable radio voice testing shall be performed using random sentences read from daily, weekly, or monthly periodicals. Both analog and digital voice modes will be tested. A successful test measurement shall be one that requires no repetition to understand the spoken message, with no syllables missing, with minimal distortion or background noise.

All portable coverage testing shall use a radio with a flexible whip antenna, worn on the belt (3'), and equipped with a speaker/microphone without antenna.

#### 5.3.1 Portables On-Street

The Coalition and Contractor shall test coverage at street level in all accessible grids.

#### 5.3.2 Portables On-Street in Critical Areas

The Coalition and Contractor shall test each area defined as a critical area as follows:

- Downtown and University area
  - For streets, the same standard used for other street-level areas will be used
  - For East Sixth Street, Congress Avenue, Guadalupe from East Martin Luther King Blvd. To 29<sup>th</sup> street, intersections and mid-block of each block (these areas are patrolled by walking beat and bicycle patrols rather than normal patrol units) will be checked on foot
  - For the UT campus, a number of points on campus will be selected, since this is essentially a "walking beat" environment

#### Lake Austin

- For the lake, a boat with GPS will be used for uniformly distributed test samples
- For areas around the lake, points of either public or private property (e.g.: parks, restaurants, known problem areas) will be selected for uniform sampling of the 300' requirement

#### Lake Travis

- For the lake, a boat equipped with GPS will be used for uniformly distributed test samples
- For areas around the lake, points of either public or private property (e.g.: parks, restaurants, known problem areas) will be selected for uniform sampling of the 300' requirement

#### Pedernales River

- For river testing, a boat equipped with GPS will be used for uniformly distributed test samples
- For areas around the lake, points of either public or private property (e.g.: parks, restaurants, known problem areas) will be selected for uniform sampling of the 300' requirement

#### Barton Creek Greenbelt

 Using a surveyor's wheel to keep track of distance, tests will be performed every 1/10<sup>th</sup> mile and in known problem areas as defined by users

#### Hamilton Pool Park

 Using a surveyor's wheel to keep track of distance, tests will be performed every 1/10<sup>th</sup> mile and in known problem areas as defined by users

#### Cow Creek Canyon

 Will be tested according to procedures used for other street level areas and residential areas

## Singleton Bend Road and Gloster Bend Park

- Singleton Bend Road Will be tested according to procedures for other street level areas and residential areas
- Gloster Bend Park Using a surveyor's wheel to keep track of distance, tests will be performed every 1/10<sup>th</sup> mile and in known problem areas as defined by users

#### Pace Bend Park

- Roadway Will be tested according to procedures for streets in other areas
- Park area Will use personnel on foot or bicycle with GPS devices for uniformly distributed samples throughout the park, with special attention to camping areas and hiking trails

#### Round Mountain/Nameless Road area

 Will be tested according to procedures used for other street level areas and residential areas

## 5.3.3 Portables Inside Buildings (General)

Portable testing shall take place on the first two floors of each building tested. An equal number of points will be tested on each floor. Elevators and basements are excluded from this test, except as specifically noted in 5.3.5 — Portables in Underground Facilities. Stairwells are included in testing and required coverage.

Each building tested must meet 95% reliability overall for the total number of points tested in the building. Should a building fail to demonstrate passing audio quality for 95% of its test points, that building shall be identified as a failed test site. In order to qualify for acceptance, no more than 5% of buildings tested in each category shall fail.

## 5.3.4 Portables Inside Mandatory Buildings

Coverage inside the buildings or structures listed in section 5.1.1.3 is desirable, regardless of penetration loss. The system shall be designed in such a way as to ensure 95% reliable coverage within these buildings, either through the placement and configuration of tower sites, and/or by incorporating in-building solutions such as Bi-Directional Amplifiers (BDA). Proposers shall provide a cost proposal for each facility that will require in-building solutions or additional tower sites.

If failure to provide 95% reliable coverage inside any of these buildings is identified, the vendor will be responsible for modifying the system at no additional cost, as may be necessary to achieve the required reliability within the failed building. This may include any or all of the following approaches:

- bi-directional amplifier (BDA) system installed in the building
- passive repeater systems installed in the building
- satellite receiver systems in or near the building
- modifying/adjusting repeater site antenna systems<sup>1</sup>
- addition of a complete tower site

# 5.3.5 Portables Inside Underground Facilities

Coverage inside the below ground buildings or structures listed in section 5.1.1.4 is desirable, regardless of penetration loss. The system shall be designed in such a way as to ensure 95% reliable coverage within these buildings, either through the placement and configuration of tower sites, and/or by incorporating in-building solutions such as Bi-Directional Amplifiers (BDA). Proposers shall provide a cost proposal for each facility that will require in-building solutions or additional tower sites.

If failure to provide 95% reliable coverage inside any of these buildings is identified, the vendor will be responsible for modifying the system at no additional cost, as may be necessary to achieve the required reliability within the failed building. This may include any or all of the following approaches:

- bi-directional amplifier (BDA) system installed in the building

If any changes are made to the fixed sites (such as re-orienting antenna patterns), then complete Countywide re-test of coverage may be required, at the Coalition's sole discretion, and at no additional cost to the Coalition.

- passive repeater systems installed in the building
- satellite receiver systems in or near the building
- modifying/adjusting repeater site antenna systems<sup>2</sup>
- addition of a complete tower site

## 5.3.6 Portables Inside Random Buildings

For this test, buildings shall be selected by the Coalition at random throughout the service area. One building per grid shall be chosen. Wherever possible, buildings shall be chosen that are representative of the type of building for which coverage in that grid is predicted (i.e., small buildings will be selected within the 10 dB contour, medium buildings will be selected within the 15 dB contour, and large buildings will be selected within the 20 dB building contour).

If any of these buildings fail to demonstrate 95% reliable coverage, the following procedure will be followed:

- Measurements will be made from every failed test point to determine if building loss exceeds the allowable loss value for that specific test point.
- If penetration loss exceeds the allowable loss value, that specific test point will be omitted from reliability calculations.
- If penetration loss is less than or equal to the allowable loss value, that specific test point will remain included in the reliability calculations.
- After determining which (if any) test points are omitted, reliability calculations will be repeated. At that time, reliability of less than 95% for the structure represents a failure for the building.

If a building fails the coverage test, but the loss at the failed points is demonstrated to be more than the allowable loss value, then the Coalition may elect to have a BDA or another solution installed at their expense.

Failure to meet the required reliability shall be corrected by the contractor at no cost to the Coalition. Such correction shall not be in the form of modifications targeted at the building tested, but shall be in the form of reengineering the system to improve coverage in that area. Corrections targeted at the failed building (such as distributed antenna systems) would be viewed as

If any changes are made to the fixed sites (such as re-orienting antenna patterns), then complete County-wide re-test of coverage may be required, at the Coalition's sole discretion, and at no additional cost to the Coalition.

modifying the test data rather than addressing the system problem which such failure has demonstrated. Acceptable methods of correction include:

- Modification of tower site antenna patterns, heights, models, etc.
- Modification of tower site equipment (filter systems, amplifiers, transmit power, etc.)
- Re-location of tower sites to improve system coverage
- Addition of new tower sites, with the same number of channels as all other sites, fully integrated into the system.

After making any of the above system modifications, coverage tests shall be repeated for the entire area affected by the sites undergoing modification. Such re-tests shall be performed at no additional cost to the Coalition.

## 5.4 Mobile Radio Coverage Testing

Mobile coverage testing shall be conducted using both signal measurement and audio quality tests. Both tests must be passed to qualify for acceptance.

In order to avoid subjective interpretation of coverage test results insofar as possible, signal level testing shall be done with an automated test setup that automatically records the position of the test vehicle (by means of GPS positioning) at the time of a reading, and records the signal strength of at least 500 signal samples taken over 40 wavelengths for each test grid, with the sampling rate adjusted for the vehicle's speed. Field strength received by a mobile radio or by a base receiver from a mobile transmission shall be sufficient to provide the specified level of audio quality in a moving vehicle. The mobile antenna shall be a quarter-wave antenna and shall be roof mounted (antenna center line at 5') on standard passenger vehicles. At the beginning of each day of testing, the test setup shall be calibrated to demonstrate and ensure that the signal levels recorded by the test setup are accurate.

At the end of each day, the Contractor shall provide a copy of all recorded test data to the Coalition. The test output shall be fed into a laptop computer or an equivalent computer device. The Contractor shall submit a report containing an analysis of the test results to the Coalition at the conclusion of the test. All test data, in its raw form, with the calibration table, shall also be made available to the Coalition for analysis. Any software required to read test results shall be provided to the Coalition by the contractor.

The audio quality test shall follow the same methodology as the portable test described in the previous section.

## 5.5 Coverage Test Results

A report shall be prepared by the contractor and shall include the following information for each test:

- Test Number
- Test Location
- Circuit Merit Rating
- Day and Time
- Test Conditions (radio, antenna, etc.)

Test results shall be displayed on 11" x 17" maps of the Coalition service area. Grids shall be color keyed to indicate test results.

A written test report shall be provided summarizing the test results and recommending any corrective steps that may be required to fix any failed test.

## 5.6 Coverage Test Failure

The coverage test shall be considered to have failed if any of the following conditions are demonstrated:

- Failure to demonstrate acceptable audio quality in more than 5% of the grids tested throughout the Coalition service area in any test.
- Failure to demonstrate acceptable audio quality in more than 5% of the points tested in any critical area.
- · Failure to pass any of the in-building coverage tests.

If the system fails the coverage test through either the portable or mobile conditions described above, then the contractor shall take corrective action. This action shall be at no cost to the Coalition, either for the corrections or for re-test to verify adequacy of the corrections.

## Failure in wide area portable and/or mobile testing

During the wide area testing, it shall be understood that a failed test point is a symptom of a weak coverage area. No correction will be acceptable that is designed to specifically correct only the failed test point.

An example follows: An area north of Site A fails. As a corrective measure, the antenna pattern is reoriented from facing south to facing north. In this example, re-test of only the failed grids north of Site A shall not be accepted. Instead, re-test shall also be performed throughout the area covered by the site to the south in grids that passed under the original test. This is required since coverage in the south may have been degraded by this modification. Areas of potential overlap or interference may also be retested. The Coalition plans to be fair and reasonable as to what areas (if any) will be re-tested. However, the Coalition reserves the right to define areas of re-test at its sole discretion as deemed to be in the best interests of the Coalition.

## 5.7 Radio Coverage Prediction

For the purposes of your proposal, radio system coverage shall be predicted through the use of a radio wave propagation model which has been developed on the basis of theoretical and empirical data, and which will take into account terrain irregularity, foliage, urban clutter, building penetration losses, noise, and long- and short-term signal variations. The model used for the purposes of the coverage prediction process shall be identified in your proposal, and the rationale for system gains and losses used must be provided. A table of system gains and losses utilized in each propagation analysis must be provided. A 3 arc-second terrain database is required. You must identify the terrain data model used in your coverage predictions. Your propagation analysis system must account for both vertical and horizontal antenna patterns.

Coverage maps for individual site analyses shall be presented on  $11" \times 17"$  media using a USGS 1:250,000 scale topographical maps. The scale on the finished map shall be 1" = 4 miles. The Coalition's required coverage area for mobile and portable coverage shall be clearly displayed on each map.

To simplify comparisons of different proposals and predictions, the Coalition requests that all vendors use the same map format. One map shall be prepared for each site, showing the "limiting case" of talk-out or talk-back, for each of the conditions outlined below. Each site's predictions shall appear as concentric colored regions, as follows:

- In building portable coverage, radio worn at belt level (3'):
  - inside heavy structures, up to 20 dB penetration loss (yellow)
  - inside medium structures, up to 15 dB penetration loss (orange)
  - inside standard structures, up to 10 dB penetration loss (red)
- On-Street portable coverage with portable radio worn at hip level (3') using a speaker microphone without antenna (green)
- On-Street portable coverage with radio at head level (blue)
- Mobile coverage (roof mounted antenna, centerline at 5' above ground) (violet)

Composite coverage maps shall also be provided for each simulcast network, and for the overall system. Composite maps shall be prepared for both the talk-out case and the talk-back case. These maps shall be printed on  $11" \times 17"$  media, using 1:250,000 topographical maps, reduced to a scale of 1:375,000, or 1" = 6 miles.

For each of the above conditions, coverage maps shall be provided to depict 95% area reliability at the specified level of audio quality.

In addition to the traditional coverage maps, the Coalition is also requiring that your proposal include a map of the Coalition's radio service area identifying distortion areas that result from time delay interference or audio amplitude interference. This analysis shall be displayed on 11" x 17" media.

A discussion of the input parameters utilized in preparation of this exhibit must be included in your proposal, along with the rationale of their selection. You must show enough detail to allow your predictions to be reproduced by another RF engineer. The methodology used to calculate areas of distortion must also be described thoroughly.

If your propagation model uses a database for environmental clutter losses, then a separate exhibit must be provided showing where each category was used. This map shall be accompanied by a table that describes each category and lists the loss value associated with it.

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#### 6.0 ANALOG/DIGITAL TRUNKED RADIO SYSTEM

## 6.1 General System Overview

## 6.1.1 Design Concept

The new trunked radio system will replace many of the existing radio systems in use by Coalition member agencies. The new system will be installed while the current systems are still in place and operating. This requires the ability for both the current and the new systems to work simultaneously during the implementation phases. A carefully thought out and detailed migration plan must be developed to ensure the continuous operation of the communication systems. This migration plan shall include, but not be limited to:

- · Tower sites
  - > antennas, and
  - > radio towers, and
  - > associated buildings and equipment,
- Interfaces between Systems
- · Dispatch facilities
  - > Backroom control equipment
  - Radio Consoles / Workstations and equipment
  - > Radio Control Stations
  - Electrical Power requirements
  - Antennas,
  - Back-up Mobile relay
  - > Provisions for "dual-mode" operation
- Mobile Radios
  - Installation / Removal
  - > "dual-mode" operation
- Training

A training period will follow the installation period, where the dispatchers and radio users are to become familiar with the new system operations prior to the phase-in of the new system.

The new system is intended to support the Coalition agencies for at least the next ten (10) years following system acceptance. System size, capacity, functionality and flexibility must be sufficient to support the Coalition's growth and changing needs for

this period, as well as the possibility of other agencies within the County participating in the system. The design approach shall have the flexibility to accommodate additional users who may enter the system at a later time.

The preferred system configuration shall consist of a combination of simulcast cells and standalone sites as required to provide the specified coverage and capacity. Trunked radio systems have a limitation in the number of radio channels that can be supported by a single site controller, and there are distance limitations imposed by technology that will limit the maximum separation between repeater sites within a single simulcast cell. Your proposed system must address both of these design considerations clearly and shall explain how your particular solution will allow the Coalition to grow the channel capacity of the system on an "as needed" basis over the next 10 years from system acceptance. It should be noted that several agencies using the system require encrypted audio, which may impact your design process.

The system shall be designed to meet the coverage requirements spelled out in Section 5.0 preceding.

Also included are the five (5) mutual aid National Public Safety Planning Advisory Council (NPSPAC) 821 MHz channels. These channels shall be simulcasted from three sites selected to maximize County-wide coverage.

The 800/900 MHz trunked radio system architecture shall be fully compliant with APCO Project 16B for public safety trunked radio systems.

As part of this turnkey contract, the contractor shall use existing Coalition owned facilities wherever possible, or shall provide a loop protected wide-band transmission network to interconnect all sites. Where loop protection is not practical, "spur" links will be considered. Any spur links shall be configured as Hot Standby, Hot Switchover SONET digital microwave links. Microwave requirements are detailed in Section 8.0.

The contractor shall also supply all console equipment, furniture, and related ancillary equipment for the new dispatch centers as defined within this document.

The Austin Police Department's primary dispatch center is currently located 715 East 8<sup>th</sup> Street in downtown Austin. The existing center is not physically large enough to accommodate the growth of the Coalition's dispatching operations over the next 10 years. As part of the development of the new radio communication system, the Police Department will install 22 new CRT based dispatcher consoles with furniture and the furniture to support 45 new Call-Taker positions in a new facility. The location and layout of the new facility has not yet been determined.

The primary wide-area controller and the Coalition's central console audio switch shall be located at the City of Austin Radio Shop, located at 1006 Smith Road. The backup wide-area controller and audio switch shall be placed in a secure location to be determined after contract award.

The current Austin Fire dispatch facility is located at 715 E. 8<sup>th</sup> Street in Austin. The Fire Department will also be moving to the new consolidated center with the Police and EMS departments. The new Fire Dispatch Center will initially incorporate four (4) call-taker positions, five (5) combination dispatcher/call-taker positions, and one (1) supervisor position, with furniture for each.

The current Austin EMS dispatch facility is located with Police and Fire Dispatch at 715 E. 8<sup>th</sup> Street. EMS dispatch will also be moving to the new consolidated dispatch facility. The new EMS Dispatch Center will incorporate two (2) call taker only positions, eight (8) combination operation/tactical positions, one (1) supervisor position, and one (1) manager position, with furniture for each.

The Austin Police, Fire and EMS console systems would share a console electronics switch at the proposed new consolidated dispatch center.

Austin Energy will also be utilizing full radio consoles, at least at its main dispatch site and possibly at other sites, as opposed to control stations.

The proposed, new Travis County Sheriff's Dispatch Center location has not been determined yet. The new Sheriff's Dispatch Center shall incorporate seven (7) call-taker / CRT based console operator positions with furniture, plus one (1) supervisor's position with furniture. The Sheriff's Office's dispatch console system shall be supported by its own dedicated console switch. The console system should operate independently of the City of Austin dispatch console systems, but shall provide direct intercom capability between all operator positions on both systems.

As the location of the proposed new consolidated dispatch center has not been determined yet, an interim dispatch solution will be required for the transition period. Proposers shall include in their submittals, the option to provide desktop CRT consoles in the existing dispatch centers to allow dual operation of conventional and trunked systems during the phase-in period. Quantities of dispatch consoles to be installed in existing dispatch centers are provided in Section 9.0 of this document.

Backup of Public Safety dispatch points for Austin Police, Fire and EMS shall be located at various locations within the City and County, as described in Section 9. A location for a backup dispatch facility for the Sheriff's Office has not been finalized at this time.

Transportation and Natural Resources will have one (1) call-taker position, two (2) combined call taker/ dispatcher positions, and one (1) supervisor position at the Travis County Executive Office Building at 411 W. 13<sup>th</sup> Street.

The Capital Metropolitan Transportation Authority's new dispatch center will be located at 2910 East Fifth Street in Austin. The console electronics switch for this facility will be located on-site and linked back to the central site via GAATN fiber facilities. New CRT based radio control consoles with supporting furniture shall be provided for four (4) dispatcher positions and two (2) supervisors.

Other Coalition agencies shall be able to conduct dispatch operations using CRT consoles connected to the network via GAATN fiber interface. These consoles will be set up on existing furniture surfaces or new furniture that will be provided by these agencies.

Dispatch Center requirements are further detailed in Section 9.0.

To ensure reliable operation, the trunked radio system shall not have a potential for a single point disabling failure in its control system or audio-processing path. If the system or any subsystem architecture includes a master network and/or primary site trunking controller, a redundant sub-system with full functional capabilities shall be provided.

If the system architecture utilizes a Master Network Controller/Audio Switch (MNC/AS), it shall have a fallback/redundant MNC/AS with full capabilities at another location. The fallback MNC/AS shall automatically maintain or receive the current user database of the active MNC/AS on a real-time basis. The location for the fallback MNC/AS shall be determined following contract award. The primary Master Network Controller/ Audio Switch shall be located at the City of Austin Radio Shop at 1006 Smith Road.

Subscriber units include control stations, and handheld and mobile radios. The radios shall support talkaround operation without reliance on the fixed network.

The new system shall be installed in stages. Stage I shall include the complete installation and optimization of the 800/900 MHz radio infrastructure which is comprised of multiple 800/900 MHz radio base station sites consisting of base repeater radios, microwave system or fiber interface, towers, shelters and associated equipment. Other items included in this stage are the installation of dispatcher equipment and the associated console electronics for the system at the City of Austin

Water & Wastewater Department, using existing console furniture.

Installation of mobile radio units, portable units, and dispatch consoles of at least one non-Public Safety radio user shall be part of Stage II. At this time, the Coalition expects that this stage will include full conversion to the new system by City of Austin Water & Wastewater Department, the Texas House of Representatives, and the Texas Legislative Council. In addition, selected personnel from Coalition public safety agencies will acquire and use radios on the new system for testing and evaluation purposes.

Stage III shall involve the installation of additional user agencies and the remaining dispatch points in an orderly sequence.

## 6.1.2 Digital Operation

The Coalition is interested in purchasing a system infrastructure capable of providing digital operation for Public Safety units and lower cost analog operation for Public Service agencies. The system infrastructure shall support both modes of operation simultaneously and provide interoperability between the analog and digital users.

The digital system being offered shall provide the following features:

- Digital Modulation (QPSK-C, Pi/4DQPSK, or 4-ARY CPM)
- The future ability to support at least two simultaneous conversations within present 25 kHz channel assignment through either FDMA or TDMA technology
- · 9600 BPS working and control channel speed
- Improved Multiband Excitation (IMBE) vocoder
- Advanced digital encryption such as DES
- Superior audio clarity through advanced error correction techniques
- Ability to directly interface data terminal devices such as MDT's
- Ability to support future growth and expansion for at least the next 10 years

## 6.1.2.1 Spectrum Efficiency - Future Migration Path

Offerors are required to discuss their plans for implementing spectrum efficient technology in the future (i.e. channel bandwidth of 12.5 kHz or less, or digital multiple access schemes that allow for the equivalent of two or more channels per 12.5 kHz bandwidth).

Offerors shall describe the migration path for such spectrum efficient operation. The migration path shall be described specifically detailing what upgrades are required to subscriber equipment software, replacement of hardware required, or changes in base station or console system infrastructure that will be needed to facilitate the spectrum efficient operation.

"Channel splitting" that requires replacement of certain base station transmitters and receivers to accommodate the spectrum efficient technology must be thoroughly described. The method of accommodating dual operating modes within the same base station infrastructure shall be described (i.e. differing formats on the control channel, use of multiple control channels or dynamic bandwidth allocation).

Dual mode operation of subscriber units to provide compatibility with the system to be proposed in this procurement and with the future spectrally efficient digital modulation techniques must be described. The cost and performance implications of such dual mode operation should be provided and described.

## 6.1.2.2 Multiple Manufacturers & Dealers of Subscriber Equipment

The Coalition has determined that competition in the procurement of subscriber equipment in the future is of importance to its operations. While the Coalition understands that the base station and interconnecting infrastructure comprising the initial system may contain certain unique and proprietary technologies, the future addition of subscriber units must be open to competition from multiple manufacturers and dealers. Offerors shall name other manufacturers who have obtained the necessary technology licenses and who are manufacturing, or have proposed the manufacture of, compatible subscriber equipment. Other sources of mobile radios, portable radios, radio modems, control stations and conventional base stations are of interest to the Coalition. Offerors shall also name dealers who are licensed to sell the mobiles and portables that will operate on their proposed system.

## 6.1.3 System Capacity

The Coalition requires a system capable of supporting the traffic generated by its user agencies. During the final months of 1997, RCC monitored 108 channels in use by Coalition agencies. To ensure realistic results, the measured data was reviewed by user agencies and corrected where needed. Also, a growth factor of 3% per year was included. The measurement system, user review, and growth factoring produced the following results:

Measured Peak Use (during Busy Hour)	1531 Minutes/Hour
Corrected Peak Use (Info from users)	1898 Minutes/Hour
Anticipated Peak Use in year 2000	2074 Minutes/Hour
Anticipated Peak Use in year 2007	2543 Minutes/Hour
Anticipated Peak Use in year 2010	2779 Minutes/Hour
Measured Average Transmission Length	3.66 Seconds
Typical Message Length (5 transmissions)	18.3 Seconds

The above quantities of channel loading were entered into traffic queuing calculations or tables, resulting in the minimum channel capacity that the new radio system must provide. The results are shown in the following table:

For traffic with an average message length of 18.3-seconds, ensuring that less than 1% of all users will experience no longer than a 2-second delay in accessing the system, the system must have at least the following number of channels:

Current Load (1997)	47 Channels	
Year 3 Estimated Load (2000)	49 Channels	
Year 10 Estimated Load (2007)	60 Channels	
Year 13 Estimated Load (2010)	64 Channels	

Therefore, the Coalition requires a system infrastructure capable of supporting a minimum of 64 channels in the year 2010. All towers, shelters, generators, and communication links shall be designed to exceed this capacity requirement.

The Coalition expects that the loading of the system will take place over several years. The Coalition would prefer to construct a system with an initial capacity of 48

channels, then grow the system as traffic usage patterns indicate. Your proposal shall include an initial build out with 48 channels of capacity on all towers east of Ranch Road 620, and 24 channels on all towers west of Ranch Road 620. It is preferred that the 24 channels on the western sites be part of a countywide 24 channel simulcast system, and the remaining 24 channels on the eastern towers will be part of one continuous system.

If your design approach requires additional towers for small, regionalized fill-in, then additional channels may be used in your design.

Your proposal must include a thorough discussion of the channel expansion process, including costs per site per channel, and should indicate any additional savings for adding channels in larger numbers.

## 6.2 Simulcast Operation

Wide-area coverage is defined as operation over an area that cannot be covered by a single base station site.

#### 6.2.1 Transmitter Simulcast

The simulcast design shall be GPS synchronized and shall have the capability to connect audio and data between the prime control site and transmit sites via DS-1 microwave circuits or via fiber based T-1 circuits. A new Coalition owned digital microwave or fiber optic system with Sonet microwave (refer to Section 8.0) will be the media used in this system. The Coalition has indicated that it has additional capacity in the Greater Austin Area Telecommunications Network (GAATN) and other fiber networks owned by Coalition members (refer to Section 8.3). Subject to Coalition approval, this additional capacity may be utilized to support the Coalition's trunked radio system. A system route map that identifies the location of fiber optic facilities will be provided at the Proposer's Conference.

The trunked system shall be capable of automatically adjusting the path delay and amplitude of any one or all DS-1 or T-1 circuits utilized in the system. The automatic adjustment shall compensate for any change in Coalition owned microwave paths or T-1 provider paths. The system shall be capable of maintaining a phase delay (launch time) of no more than ± 3 microseconds and amplitude characteristics of 0.1 dB between transmit sites. The path delays shall be dynamically adjustable to compensate for at least 60 milliseconds of inherent path delay.

A written response to these items shall be included in the Offeror's response:

Renetting Interval - The recommended interval and means by which the system is to be "renetted" or verified with respect to adjustment of frequency, modulating signal amplitude and phase, shall be specified.

Simulcast Time Delay Control - Once the path delays have been measured, the method by which audio path time delay will be automatically controlled and equalized shall be specified. The maximum amount of path delay compensation shall be specified.

Frequency Stability - The method by which the frequency of base station transmitters is maintained within the required tolerance for satisfactory simulcast operation shall be specified, and this value shall be provided.

Addition of Sites - The procedure and equipment required for the addition of base repeater or receiver sites shall be specified. Also, the maximum site capacity of a single simulcast "Site" or "Prime" controller shall be specified.

Addition of Channels - The procedure and equipment required for the addition of base repeater or receiver channels shall be specified.

Control of Sites - The method by which the simulcast remote sites are controlled and interfaced with the trunked system controller shall be described. Link type and bit rate shall be specified.

System Architecture - The trunked simulcast system architecture shall be described in detail, with written descriptions of all major system components and their functions. System and site block diagrams shall be provided to show the interconnection and the detailed audio/logic signal flow (e.g.; tx audio +/-, keying +/-, etc.) between system elements (components/equipment racks).

## 6.2.2 Digital Voting/Comparator System

A receiver voting/comparator system shall be furnished and installed which will allow the automatic selection of the receiver providing the lowest Bit Error Rate (BER) and Error Correction Coding (EC). The voting/comparator shall pass the selected audio to the dispatch consoles and the simulcast audio distribution network for rebroadcast to other mobile or portable units. The receivers operating in the voting system shall,

at minimum, be those included in the base repeater stations. The consoles at the City's Primary Public Safety Communication Center shall have priority over the comparator in controlling the repeater audio input. The operation of the comparator/selector shall not be evident; there shall be no clipped syllables and no noticeable delay in the selection process.

The comparator shall be radio frequency band independent. It shall incorporate frame diversity, which allows the comparator to utilize the best data frames of all the inputs to construct a better output signal than any one single input signal of the comparator.

Each receiver shall generate "idle data" when it is in the idle (squelched) state. The idle data shall be transportable by a DS-1 or T-1 audio circuit.

The comparator shall provide an indication of a failed Digital Microwave, fiber audio circuit, Sonet Microwave, or input serving a receiver through loss of detection of idle data, or by other supervisory method.

The receiver voting comparator shall be equipped to provide a voting activity display and output. Voting activity displays shall include: receiver selected, receiver unsquelched, receiver failed and receiver disabled.

## 6.3 Trunked Operation

The trunked repeaters shall be managed by the Master Network and/or Primary Site Trunked Controller that selects the communications channel. When a request for communications from a field unit occurs, the controller shall acknowledge the request and assign an idle channel for communications. The proper talkgroup also shall be assigned.

The system shall allow a transmitting unit access to an available channel and unmute a receiving unit's speaker with the transmitting unit's audio within 0.5 seconds of the transmitting unit's Push-To-Talk (PTT). Should system traffic be at a level where all channels are busy, the system will automatically give preference to higher priority units attempting access. The system shall indicate to the user that channels are busy, that the unit is placed in queue, and will be offered a channel in a call back mode. The Proposer shall describe the extent of priority the system offers.

User defined quantities of mobile and portable units shall be equipped with a dedicated switch or function that allows emergency access. The switch shall be easily accessed, but designed to minimize the chances for accidental activation. Upon emergency activation, the field unit shall transmit the Unit I.D. and emergency message on a periodic basis until acknowledged by the console operator (dispatcher). Section 17.0 - Pricing, lists quantities

and configurations of mobile, portable, and control stations by agency.

## 6.3.1 System Operating Modes.

The new trunked radio system shall be capable of operating in the following modes:

#### 6.3.1.1 Trunked Mode

Day-to-day communications by all users occur using this mode. While in the trunked mode, the system should initially provide for the control of trunked channels at all sites. Expansion capabilities to support additional channels and dispatch consoles that may be required in the future must be incorporated into the basic system design. Offerors shall discuss expansion capabilities and limitations of the hardware being supplied, detailing maximum number or combinations of simulcast sites, non-simulcast sites/sub-systems, channels, dispatch positions and subscriber units.

#### 6.3.1.2 Talk-around Mode

The mobile, portable and control station radios shall be capable of transmitting and receiving on the repeater's transmit frequencies for localized communications. The talk-around mode, which shall be user selectable, shall provide simplex radio channels for direct communications between subscriber units.

## 6.3.1.3 Encrypted Mode

All channels of the trunked simulcast system shall be installed and equipped to repeat digital voice encryption. All subscriber units properly equipped with encryption shall be able to scan between and converse on encrypted and clear talk groups. All Coalition Public Safety dispatch positions shall be capable of utilizing the encrypted channels. The range of the system in encrypted mode must equal the range of the system in clear mode. The price for encryption should be itemized, on a per channel basis.

The encryption process shall not degrade the audio quality of the system. Encryption shall be available in trunked, conventional and talkaround modes. Offerors shall state the number of encryption algorithms available in their system and the encryption algorithm capacity of their radio units. Multiple keys must be provided. The system shall be capable of rekeying the encryption algorithm over the air. If the system does not meet this requirement by the start of the field acceptance test, the Proposer shall provide a time frame for implementation, and bear the cost of upgrade to provide rekeying of the encryption algorithm over the air. The Proposers shall fully discuss their encryption scheme in their proposals. Proposers shall fully discuss all timing issues associated with their digital encryption products.

#### 6.3.1.4 Failure Modes

The central trunking controller assembly shall employ a redundant design to ensure that a single point of failure does not result in any complete system failure. If the system should encounter a controller failure, the system should not lose any system features. The system should continue to function in the trunked mode with all features operational. Redundant or fallback trunking controllers are required at the Master Network level and the central Site/Prime or sub-system level.

Failure mode operation also occurs when the trunked backbone fails. If a link fails to an individual site, while others remain operational, then that site shall be removed from service. If the system distribution network fails completely, the system should revert to stand alone repeater site operation. All subscribers shall indicate when a site or cell is operating in a standalone mode, or when the system is in any other fallback mode.

For worst case failure and if all base stations are operational, the system shall utilize all repeater stations to provide communications. The console dispatch operation shall continue to talk (Tx/Rx) into the system during this mode of operation. Dispatching shall not be orphaned during any mode of operation. The assignment of repeater stations to other user groups shall be identified by the Coalition in the development of the System Implementation Plan (fleet mapping process).

## 6.3.2 Master Network Controller and Associated Subsystems

The Master Network Controller (MNC) and/or Primary Site Controllers are critical components of the system. The design shall provide for high reliability under extreme emergency conditions and redundant network controllers or fallback designs are required.

If a Proposer's design requires an additional site or sub-system controller to be slaved off of the MNC, the MNC will have complete control of wide-area call processing and assignments until its failure, or failure of another critical network component. At that time, the site or sub-system controller should take over trunking control, utilizing the same user database and functionality. All subscribers shall be provided audible and visual indications when the MNC fails.

#### 6.3.2.1 General.

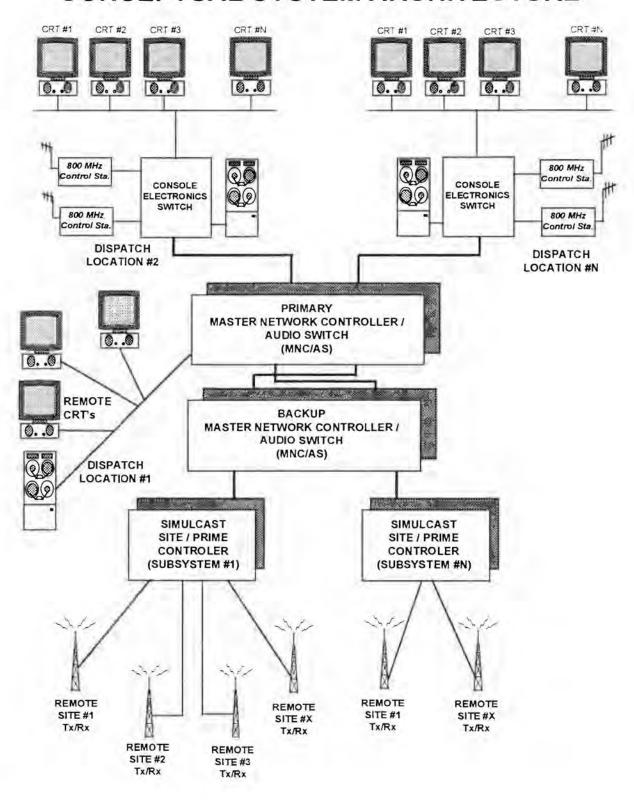
General tasks to be performed by the MNC and/or Primary Site Controllers include receipt and decoding of digital data from mobile, portable or control station radios, selection and assignment of vacant radio channels, transmission and encoding of digital data sent to mobile, portable or control station radios, control of base repeaters, transmission of station identification required by the FCC, and monitoring of alarm functions.

## 6.3.2.2 Reliability and Redundancy.

It is the intent of this specification to provide a trunked system that will not suffer the loss of trunking capability as a result of the failure of a single system component, in particular the Master Network Controller and/or Primary Site Controller. Should any component of the MNC fail, sufficient redundancy shall be incorporated in the system design so that full trunking operation continues without interrupting existing communications. Trunking capability is defined in this context as the ability of the system to assign voice channels to independent talkgroups, as required, and the ability of the system user groups to remain functionally independent (i.e., full APCO 16 feature set with no loss of features). A single controller failure that reverts the system to a non-APCO 16 feature set operation is not acceptable.

ANY SYSTEM COMPONENT ENCLOSURE OR POWER DISTRIBUTION DESIGN THAT COULD RENDER THE SYSTEM OR 25% OF ITS CHANNEL RESOURCES USELESS FOR COMMUNICATION FROM A SINGLE POINT OF FAILURE, SHALL INCORPORATE REDUNDANCY. This may be in the form of a redundant component/enclosure or a distributed redundant design which distributes single points of failure among multiple card cages, cabinets or housings each operating on its own dedicated power circuit.

## **CONCEPTUAL SYSTEM ARCHITECTURE**



In the case of redundant controllers, both controllers shall remain on line continuously with parallel updating of the system data base to provide minimal interruption of service in the event of failure of the main controller. Switching from main to standby operation shall be fully automatic, with audible and visual indication of the switchover provided to the supervisory console positions in the Austin Police Dispatch Center, the Travis County Sheriff's Office, and the Radio Service Center. These positions are further defined in Section 9 - Dispatch Radio Consoles. Offerors shall specify the amount of time between main controller failure and the resumption of trunked operation under the standby system. Offerors shall also specify the type of failure indication that will be provided to the supervisory console operator.

Remote switching from main to standby controller operation shall be provided at the City's Radio Shop, the Austin Police and the Travis County Sheriff's Office supervisory consoles as a manual override to automatic switchover. Offerors shall specify the period of time required and the procedure for manual switchover to a redundant central controller.

Switching between controllers (manually or automatically) shall not require more than 10 seconds, and shall not cause subscriber units to attempt to roam away from the site or subsystem they are currently on. Also, subscriber units shall not have to re-affiliate themselves with the system after a controller switch has occurred. This is to prevent inbound signaling overload of the controller.

The procedure and the time required for switchover to a conventional or reduced capability operating mode in the event of the failure of all trunked control logic shall be described in the proposal. Proposers shall also describe how the system will operate under such conditions.

It is understood that all systems that meet the intent of this specification must suffer multiple system element failures before a conventional or reduced capability operating mode is encountered. Proposers are nonetheless required to describe such a failure mode, regardless of how unlikely its occurrence.

## 6.3.2.3 System Features and Functions.

Software and firmware to provide functions and features described shall reside in the Master Network and/or Primary Site trunking controller and associated computer software/hardware. The controller and its associated computer software/hardware shall provide the following functions:

## - Alarm Monitoring and Diagnostic Functionality

Monitoring of the operational status of all system devices and providing alarms when subsystems fail. Diagnostic functions shall allow an operator to view current status and status history of the system. It shall also allow for diagnostic tests to be performed on network devices (i.e. site controllers, base stations, comparators, etc.) to verify component and path integrity.

## Signaling (Control) Channel Backup

Automatic transfer of signaling functions to another channel in the event of transmitter or receiver failure or interference on the signaling channel shall be provided. Each system shall have one active and a minimum of three backup signaling channels for simulcasted and non-simulcasted subsystems/cells. Backup is defined as a channel of different frequency. Hot standby backup of a signaling channel to a station of the same frequency is not acceptable.

#### Disablement of Failed Voice Channels

Automatic disablement of defective voice channels due to subsystem failure shall be provided. Failures must be detected prior to the channel being assigned by the controller. Subsystem failures to be detected shall include, at a minimum:

- Low forward power
- · High reflected power
- · Unidentified carrier on unassigned voice channel
- Signaling interface failure between base and controller
- Audio circuit failure between controller and base
- Voter receiver failed
- Voter receiver disabled

#### - Manual Disablement of Voice Channels

The ability to manually disable selected voice channels by authorized users shall be provided.

## System Usage Reports

Collection and processing of data with regard to system usage. Proposers shall describe how the data is parsed for displaying at the System Manager's terminals. Also, at a minimum, data to be routed to a printer shall include the following:

- Error Event Log
- # PPT's per talkgroup per interval of time
- # PPT's per system per interval of time
- # of calls by type/interval
- · Call duration by type of call
- # of system busies/interval of time
- Total busy time/interval of time

## - System configuration

- Configuration information for all components in the system
- Functional configuration of controllers, channels and sites

## Subscriber Management

- Manager database (list of system managers)
- Logged on managers
- Regrouped radios
- Inhibited radios
- Storm plans
- Commands (tasks)-in-Progress (regroups, inhibits)
- Subscriber configuration and attributes (by individual, talkgroup and multigroup)

## Channel Usage

- Identification of calling units by talkgroup and unit identification number
- Time of channel access
- Duration of transmission
- Classification of call
- Channel assigned
- Site or Sub-system involved in a call

#### Fault Management

- Current alarms
- Alarm history (daily, weekly, monthly)
- Alarm history (by component)
- Technician notes

Proposers shall include sample copies of these reports and state the data storage capacity of system in days and/or number of alarms.

Any dot matrix printers associated with the output of system usage data shall be contained in a sound deadening enclosure, if such printers are to be located in the communications center.

#### - Channel Access Priority Levels

As a minimum requirement, control radio channel assignments and system access shall be provided in accordance with APCO 16B. Compliance to access time as defined in Section 6.3, paragraph 2 of this specification is required. Levels of priority shall be variable from any dispatch console in the system to allow assignment of specific talkgroup members to a higher system access priority for the duration of a special event or tactical operation. Access and control of priority levels shall be partitioned so as to allow separate control by the respective agency.

## - Dynamic Talkgroup Reconfiguration

Dynamic regrouping of mobile and portable radios shall be provided. This function shall allow units from different talkgroups to be regrouped into a common talkgroup via the signaling channel. Preprogramming of regrouping functions to allow rapid implementation of emergency plans by the Coalition shall be provided.

The time required for such regrouping, both for preprogrammed groups and individual units, shall be specified by the Proposers. Proposers shall also specify any limitations on group size and the number of preprogrammed groups that can be accommodated by their systems.

#### Selective Disablement of Field Units

Selective disablement of individual mobile or portable radios shall be provided. Reactivation of such radios which have been disabled shall also be provided. These functions shall be performed on the signaling channel. Control of this feature is to be partitioned by manager user name.

#### Control of Time Out Parameters

Control of time out parameters shall be provided at any manager user terminal. Any valid manager logged in with this capability shall be able to control at a minimum:

- · Channel Hang Time (message trunking)
- Interfering Carrier Time (length of time channel remains enabled with an interfering carrier)
- Remote Link Failure Time (length of time site remains enabled without a remote site data link)
- Channel Fade Time (length of time channels remains assigned without a carrier or low speed data present)
- Emergency Call Time (length of channel hang time when an emergency call is initiated)

#### Channel Partitioning

Channel partitioning shall allow talkgroup and individual calls to be directed or steered to a single channel or group of channels within a site or subsystem. The partitioning capability shall not prohibit any group from being allowed access to all channels. Channel partitioning shall be definable at the "subsystem" level. Subsystem partitioning means that if multiple subsystems are networked together by a Master Network controller/switch, that partitioning "tables" shall be defined in each subsystem.

## 6.3.2.4 System Programming

Programming of system operational parameters shall be provided by operator terminals controlled by the trunked system management computer. Refer to Section 6.4 for additional information regarding the location and capabilities of these terminals. These terminals shall provide for "user friendly" operation by trained personnel. Access to system programming functions shall be protected by hierarchical password security. Hard copy printout of programming functions or data is desired. Printers shall be laser printers or if dot matrix printers are provided, they shall be installed in a sound deadening enclosure, on a table or stand that allows for free feeding of continuous form paper.

To facilitate interoperability, system management shall be capable of being partitioned. Manager partitioning shall allow different Coalition managers to control their user database independently of one another. The system shall allow the partitioning of subscribers and sub-system infrastructures. Partitioning shall be defined and protected by a user name and a respective password. Partitioning shall allow access to as well as prohibit users from, different sub-systems, programming and system management areas, and subscriber ID ranges (talkgroup and individual ID ranges).

## 6.3.2.5 Signaling and Special Functions

#### Unit Identification

A real time display of push to talk unit identification at the dispatch positions shall be provided in an alias format. The maximum number of alias ID's per console operator position and system wide shall be specified by Proposers.

## Signaling (Control) Channel Updating

The signaling channel shall continually transmit the current channel assignments of the system. This feature is intended to insure that radios "signing on", coming into range, or switching talkgroup modes are directed to calls in progress on their selected talkgroup.

#### Voice Channel Embedded Signaling

Embedded or subaudible signaling shall be transmitted on assigned voice channels in order to prevent subscribers from being misdirected or allowed to transmit on an improperly assigned channel.

## Emergency Alarm and Call

A display and audible alert to the dispatcher (on the CRT console in an alias format) upon activation of an emergency switch on portable or mobile radios shall be provided. The response time to display the emergency condition at the console position shall not exceed 3 seconds. The display shall identify the unit number of the radio initiating the emergency alarm. Automatic translation of this unit identification to correlate to a "Plain English" equivalent is required.

Upon activation of the "emergency unit's" PTT, a channel shall be assigned for a predetermined amount of time. The emergency call hang time shall be adjustable by the system manager.

In the event all voice channels are occupied, the system shall be capable of functioning (via programming) in at least the following two (2) modes:

#### Emergency Priority Queuing

If all voice channels are occupied when an emergency call is made, then the unit initiating the emergency shall be placed at the top of the busy queue list and allowed access to the next available voice channel. The "emergency unit" shall be given the highest level of priority regardless of how many units are already in queue or what their priority is.

## Emergency Preemption

If all voice channels are occupied when a emergency call is made, then the unit initiating the emergency shall be allowed access to the voice channel with the lowest priority user currently assigned. It is understood that until the current user dekeys, there will be RF contention between the emergency user and the current transmitting unit. However, once the "non-emergency" user dekeys, that unit should be transmission trunked back to the signaling channel so the voice channel can belong to the emergency user. The Coalition understands the implications of this contending audio, but also realizes the possible advantages of having immediate access in an emergency situation.

#### Private Call

Selected users and dispatchers shall have the ability to selectively communicate "privately" with another individual on the system regardless of what talkgroup either unit is in. The call shall allow the two users to utilize a singe channel resource to communicate without the participation of other units in their respective talkgroups.

If the recipient of a private call has a display-type radio, the radio shall display the ID of the calling party. Respectively, the calling party shall be able to determine if the recipient did not receive or is not available for the call (i.e. recipients radio is turned off, out of range, etc.) by hearing a distinctive tone and receiving a message in their display.

The subscriber units on the system shall be programmable for at least the following three (3) modes of operation:

- Subscriber units shall be capable of Unlimited Private Call capability if desired.
  - Subscriber units shall be programmable to hold a specific list of users that can be privately called. The list shall be able to hold at least eight (8) individual

ID's. Offerors shall specify the maximum size of this list and if this list is independent of the call alert list.

- Subscriber units shall be programmable to only receive private calls from other users. These units shall never be capable (unless programmed otherwise) of initiating a private call.
- Subscriber units or the system shall be programmable with private call time-out timers.

#### Call Alert

Selected users and dispatchers shall have the ability to selectively alert another individual user on the system regardless of what talkgroup either unit is in. The call shall allow an individual to alert another user with a distinctive tone and their individual ID (on display radios only). The alert shall be accomplished over the signaling (control) channel and should not affect any voice channels on the system.

If the recipient of a call alert has a display-type radio, the radio shall display the ID of the alerting party. Respectively, the alerting party shall be able to determine if the recipient did not receive or is not available for the alert (i.e. recipients radio is turned off, out of range, etc.) by hearing a distinctive tone and receiving a message in their display.

The subscriber units on the system shall be programmable for at least the following three (3) modes of operation:

- Subscriber units shall be capable of Unlimited Call Alert capability if desired.
- Subscriber units shall be programmable to hold a specific list of users that can be call alerted. The list shall be able to hold at least eight (8) individual ID's. Offerors shall specify the maximum size of this list and if this list is independent of the private call list.
- Subscriber units shall be programmable to only receive private calls from other users. These units shall never

be capable (unless programmed otherwise) of initiating a call alert.

## Multi-Group Call

Multi-Group talkgroups shall allow multiple talkgroups to be affiliated to a single multi-group. When a call is placed on the multi-group talkgroup, all talkgroups associated with the multi-group shall be assigned to a single voice channel for the conversation. Every user involved in the multi-group call shall have talk-back capabilities for the duration of the call (if message trunked). The system shall be programmable to allow for the following two (2) modes of operation:

#### Ignore Mode

If a user initiates a multi-group call, the call will immediately ignore calls in progress on affiliated talkgroups. The multi-group call will not wait for units in those talkgroups to dekey and therefore those transmitting units will not hear the multi-group call until they dekey.

#### Wait Mode

If a user initiates a multi-group call while calls are in progress on affiliated talkgroups, then the multi-group call will wait (busy-queued) until all participating talkgroups have finished their transmission. Initiating a multi-group call should transmission trunk all calls in progress on affiliated talkgroups in order to facilitate the multi-group call.

## System-Wide Call

Shall allow a dispatcher or subscriber unit to initiate a call that will transmit on all talkgroups on all sites or sub-systems.

#### Site-Wide Call

Shall allow a subscriber unit or dispatcher to initiate a call that will transmit on all talkgroups on a particular site or sub-

system. For this type of call, a simulcast sub-system or nonsimulcast site is considered a single site.

#### Scan

This function shall provide the ability to scan through multiple modes (talkgroups) within the same system. It shall also contain the capability to store and scan a list of conventional frequencies. Subscriber units shall be provided with at least one (1) scan list per system. Each list shall contain at least ten (10) talkgroups or frequencies. The scan function shall allow individual users to add or delete talkgroups from the list.

#### - Priority Scan

This feature shall provide the ability to apply two priority levels to a *defined* scan list. While in the scan mode, a Priority One transmission shall be received regardless of the activity on the Priority Two (or other non-priority modes). A Priority Two message is heard over all (except Priority One messages) non-priority modes.

## 6.3.2.6 Minimum Specifications.

## - Power Supply

Primary 120 V.A.C., 60 Hertz. Power supply to be protected by an uninterruptable power supply that will provide filtering of line voltage and will automatically switch to a battery supply/inverter upon failure of commercial power. A bypass switch to allow maintenance or disablement of the U.P.S. shall be provided.

#### Environmental

The Master Network and/or Primary Site controller and any auxiliary controllers required at remote base station/receiver sites shall be designed to operate under the following conditions:

Temperature:	-30 degrees to +60 degrees Celsius
Humidity:	90% non-condensing
RF Fields Equipment:	Shall be properly shielded to allow proper operation in equipment rooms or buildings occupied by base station transmitters, with associated strong RF fields

### - Duty Cycle

Equipment proposed shall be rated for continuous duty.

## - System Expansion Capabilities

The Master Network Controller and any auxiliary controllers shall provide for expansion to 12 subsystems at a minimum without major hardware modifications. Modular construction with plug-in circuit cards is considered desirable.

#### Subsystem Expansion Capabilities

Each subsystem controller and any auxiliary controllers shall provide for expansion to 12 repeater sites at a minimum without major hardware modifications.

Modular construction with plug-in circuit cards is considered desirable.

## Radio Channel/Site Expansion Capabilities

Each site controller and any auxiliary controllers shall provide for expansion to 24 radio channels of operation at a minimum without major hardware modifications.

Modular construction with plug-in circuit cards is considered desirable.

#### - Data / Control Interfaces

All necessary interfaces with base repeaters, peripheral computer hardware or the radio interconnect system shall be provided by the Successful Contractor. Interfaces shall include cabling and modems, all of which shall be identified by the Proposer's functional diagrams of the system.

## Alarms and Diagnostics

The Master Network controller and its associated subsystems shall provide alarms for key operational parameters, and shall provide for remote inquiry, display, disablement and diagnostic functions via LAN connections and dial-up modem. Alarms shall be displayed at a supervisory position in the Coalition selected Radio Service Center manager's office.

## 6.4 System Manager / Information Management System

The system shall incorporate a graphical user interface (GUI) system manager/information management system to set selected parameters and allow the supervisory personnel to control and analyze system operation.

## 6.4.1 System Management

The System Management/Alarm Terminal shall include a 21" color CRT monitor with keyboard and mouse. Required system manager capabilities at a minimum shall include:

- System Configuration shall be able to control all of the programmable features of the trunking controller and radio infrastructure.
- Subscriber Management shall allow an operator to view, set, or modify the talkgroup ID's, and the unique ID permission.
- Manager Partitioning System subscriber management functions shall be capable of user (agency) partitioning. Manager partitioning shall allow a user to view, set or modify subscriber information pertaining to a particular agency while restricting access to other agencies. The highest level manager shall be capable of viewing all subscriber information. Partitioning shall allow access to, as well as prohibit users from, different sub-systems, programming and system management areas, and subscriber ID ranges (talkgroups and individual ID ranges).

- Diagnostic Management shall allow an operator to view current status
  and status history of the system, sub-system or component. It shall also
  allow for diagnostics to be performed on network devices (i.e. site
  controllers, base stations, comparators, etc.)
- Dynamic Radio Commands regrouping of system users, including the
  ability to predefine, store, and implement regrouping plans as needed.
  Sending and receiving of status messages to and from subscriber units.
  Selective radio status information regarding radio's operating status (i.e.
  on/off, inhibited), last talkgroup affiliation and last site registration.
- Selective inhibit/uninhibit of control stations, mobile and handheld radios and trunked repeaters. Field equipment shall be equipped to respond to the system manager commands.
- Activity reporting by unit, talkgroup, department (if available), and system wide.
- User data base maintenance partitioned by agency, with automatic sharing of data and updates between the console electronics and the trunking system. Unit I.D.s and aliases shall be programmable from the terminal and communicated to all equipment with unit I.D. display. A single electronic database shall be shared by the console dispatch and trunking systems.
- Activity monitor to display the status and activity of all RF channels of the active Prime Site controller.
- Capability of automatically updating the backup site controller when data base changes are made.
- User terminals shall be provided. One terminal is anticipated to be installed at each of the following locations:
  - the Master Control Point
  - the Coalition's selected Radio Shop
  - the Supervisor's position in the Austin Police Dispatch Center
  - the Supervisor's position in the Austin Fire Dispatch Center
  - the Supervisor's position in the Austin EMS Dispatch Center
  - the Supervisor's office in the Travis County Sheriff's Office

#### Dispatch Center

- the City of Austin Information Systems Office
- Water/Wastewater
- Capital Metro
- Austin Independent School System
- University of Texas at Austin
- City of Austin Public Works Department
- Austin Energy
- Printers to print activity reports or other outputs produced by the System Manager/Information Management system are required. The printers shall be HP Laser Jet V units or equivalent. One will be located with each of the user terminals.

## 6.4.2 Alarm System

An alarm monitoring package shall be provided to monitor system parameters and alarms.

It shall display alarm conditions of board level failures of all network elements to a single 21" color CRT terminal. The system architecture shall be displayed using graphical icons. Selecting an icon such as a site shall reveal the next level of system detail, allowing the user to then select the equipment shelter or tower, and then a repeater or other piece of equipment, down to the board level. Alarms shall appear as flashing icons, representing the component and sub-systems affected. Flashing icons shall alternate between red and their normal appearance.

The system shall allow the manager to view historical data on selected performance characteristics, such as transmitter power out of any repeater, per transmission, along with a graphical representation of that parameter's history (such as a bar chart showing Transmitted Power per Transmission). Access to the management system shall be controlled through the use of an encrypted password (not displayed on the screen). The system shall be capable of remoting a system manager user terminal without degradation of terminal performance. A remote user terminal shall be capable of performing /accessing all the same functions/information that a local terminal can. The speed at which the remote terminal operates shall be equivalent to that of a local terminal and the accessing of information shall not be noticeably different in physical appearance or access time. The remote terminal shall be transportable by DS-1 or T-1 data circuit. The remote terminal shall be implemented so that a user cannot

determine whether they are using a local or remote terminal

Proposers shall detail what alarms, conditions and parameters can be controlled and/or displayed through the System Management/Alarm Terminal. At a minimum, the following alarms/conditions shall be displayed:

# Radio Equipment

- Low forward power
- High reflected power
- Unidentified carrier on unassigned voice channel
- Signaling interface failure between base and controller
- Audio circuit failure between base and controller
- Voting receiver failed
- Voting receiver disabled
- Station major alarm
- Station minor alarm
- Controller major alarm
- Controller minor alarm

# Dispatch Center Alarms

- Logging Recorder Full
- Logging Recorder Alarm
- Master Time Source Loss of Sync
- Console Electronics Power Supply Failure
- Console Electronics Major Alarm
- Console Electronics Minor Alarm

#### Power System Alarms

- UPS/Battery Power Systems
- Low battery voltage
- High battery voltage
- Automatic bypass operation
- Emergency operation (UPS on battery)
- Rectifier/inverter failure
- Common trip alarm (form "C")
- Generator System
  - Generator running
  - Failure to start
  - Over speed

- Low oil pressure
- · High engine temperature
- · Low oil pressure pre-warning
- High coolant temperature pre-warning
- Low coolant
- · Low fuel

#### Microwave Alarms

As listed in Section 8.1.5.4.

#### Site Alarms

- Fire/Smoke Detector
- Intrusion alarm (door open, each door)
- High temperature alarm
- Low temperature alarm
- Loss of utility power
- Generator run
- Generator on-line
- UPS alarm
- Perimeter alarm (on fence perimeter)
- Tower light failure
- Tower mounted receiver pre-amp failure (backup on/off)
- Spare alarms (10)

The contractor shall furnish and install all alarms and equipment, including but not limited to:

- Sensors
- Contacts
- Wiring
- Programming
- Installation

Master alarm units shall be installed at the Austin Police dispatch supervisors' consoles and in the equipment room at 715 E. 8<sup>th</sup> Street, at the Radio Shop at 1006 Smith Road, and the Information Systems Office at 625 E. 10<sup>th</sup> Street, Suite 900. All remote alarm units will pass information to the Master units. Provision shall be made for the master alarm units to selectively inhibit the audible alarms or initiate an automatic timeout in 30 second intervals up to 3 minutes. When an audible alarm has been silenced but not cleared, new failures shall reactivate the alarm.

# 6.4.3 Software & Programming Accessories

Six complete sets of programming software, cables, and required interface devices shall be provided for each model of software programmable equipment included in the system.

All software utilized in the new radio system should be Windows based. Offerors are required to identify each software package that will not be compatible with this requirement.

For ease of maintenance, the Coalition prefers equipment that is remotely programmable from a fixed location, such as ISD, PD dispatch, or the Radio Services Shop. Your proposal shall detail to what extent components of your fixed end, dispatch network, or subscriber fleet can be programmed remotely. Indicate whether fixed end devices can be programmed through the network backbone, or whether dial-up or dedicated lines must be used. Your proposal shall describe your system's ability to program subscribers "over the air".

# 6.5 Telephone Interconnect

The new system must incorporate a limited number of telephone interconnect gateways. Limitations must include the total number of lines available, priority allocation by user, and call duration restrictions according to user priority. In addition, the availability of telephone interconnect features must be controllable (manually and automatically) in accordance with system loading. As dispatch-traffic activity increases on the system, the availability of telephone interconnect features must be easily restricted. The telephone interconnect feature is considered of secondary importance to normal or voice communications. The new system must support a minimum of eight simultaneous telephone interconnect calls.

Additionally, the telephone interconnect shall support talkback paging. Talkback paging is the process whereby individual portable or mobile units can be selectively called, or paged, by callers on either Coalition-owned or public switched telephone network. Additionally, the called unit would have the ability to answer and talk directly to the caller on the radio network.

Talkback paging is a desired system feature and should, as a minimum, operate in the following manner:

- Each unit shall be assigned a unique number that, through the network's operating system, can be translated to an individual portable and/or mobile unit identification code.
- Provisions must be available at the radio system's supervisory control position to add or delete unit authorization for the talkback paging feature.
- Once a unit has responded to a paged call, voice transmission control would revert to the radio unit. At anytime during a conversation the portable/mobile unit should be capable of terminating the talkback paging call.

# 6.6 Transportable Systems

Coalition agencies also require portable or transportable repeater systems to support various special situations, such as large structure fires, SWAT or surveillance operations, or disaster response efforts.

# 6.6.1 Mobile Repeaters

Coalition agencies may require a single channel on-site when responding to large structure fires. In such situations, a building may have areas not covered by the radio system, and the building's BDA system may become inoperable during the incident. Unit-to-unit, or talk-around, communications may not be possible due to the size or density of the structure. The Coalition is therefore interested in exploring several communications solutions.

- A single channel repeater, transported in the Coalition's vehicles. This
  radio should meet the following criteria:
  - 35 watts, minimum
  - 5 channels, selectable
  - compact size
  - unity gain, roof mount antennas: 1 Tx, 1 Rx
  - operate off 13.8 VDC and 120 VAC supplies

#### water resistant housing

Both fixed installations in the vehicle and suitcase style transportable packages should be proposed.

- <u>Transportable trunked repeater packages</u>. Should meet the same requirements as above, in a transportable suitcase package. Discuss the expansion capabilities of the package, and what is required to combine trunked repeaters into a transportable trunked system. Discuss encryption capabilities of your system.
- Conventional/trunked relay package. Please propose and describe equipment to allow a conventional channel received by a radio in the command vehicle to be rebroadcast over the trunked radio network by a second radio.

# 6.6.2 Transportable Repeater Site

The Coalition requires a deployable trunked repeater site that can respond to special disaster situations. This should be a self-contained unit that can be moved to the disaster scene by a Coalition vehicle. The system shall include a five-channel stand alone trunked repeater system, meeting the same functional and technical specifications as the fixed sites. A raisable antenna mast shall be included that will support a 10 dB omnidirectional transmit antenna and a 10 dB omnidirectional receive antenna. The cost of the trailer shall be included with this package.

The system shall include a generator of sufficient size to power all equipment, lighting and air conditioning in the equipment housing. The generator shall include a tank of sufficient size to allow 30 hours of continuous operation at full load.

#### 6.6.3 Innovations

In addition to the requested packages in Section 6.6, the Coalition is interested in alternative packages that will provide on-scene coverage and communications for unusual situations. Proposers are encouraged to provide pricing and complete descriptions for any alternative configurations that would meet the intent of the above requirements.

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#### 7.0 COMMUNICATION SITES

#### 7.1 General Conditions

The Successful Contractor shall be responsible for all work required to develop or renovate base station or microwave sites that will be part of the system specified in this document. Site design work shall be performed by a professional engineer with Texas registration and site plans shall be prepared by a Texas registered professional land surveyor or engineer.

A fully complete and operational radio communication system is required by this procurement. The Successful Contractor shall perform all work necessary to provide radio base station or microwave sites which meet all City, County or State inspections and approvals, and which provide the necessary antenna mounting structures, equipment rooms or shelters and all required environmental conditioning, security, power, standby power, access roads, foliage control, lighting, cable support structures, and all functions/features described in this section shall be performed or provided by the Successful Contractor.

In addition, radio control stations will be installed in a variety of Coalition facilities, some of which are identified in the *Exhibits* section. Installation plans for each of these facilities shall be prepared by the Successful Contractor for approval by the Coalition project manager.

The Successful Contractor shall be responsible for a complete and fully operable installation which is in compliance with the latest version of the National Electrical Code (or local electrical code, if applicable), local building codes, environmental laws, zoning and planning regulations or ordinances, land use restrictions, Federal Aviation Administration and Federal Communications Commission rules and regulations, Texas Department of Transportation or City/County regulations governing road access and entry, OSHA guidelines and all other applicable local, state or Federal codes, regulations, laws and/or ordinances, including RF radiation measurements as required to ensure compliance with Office of Engineering and Technology (OET) Bulletin #65. The successful contractor shall prepare all required forms and exhibits required to obtain the necessary approvals from each of the above entities.

Materials furnished by the Successful Contractor shall be new and of first quality as defined in industry standards. The Successful Contractor shall not make substitutes unless prior approval has been obtained from the Coalition project manager.

Each Offeror (prior to submitting a proposal) is required to participate in site visits and examine the sites so as to fully understand all the existing conditions relating to the work. Site visits will be scheduled by the Coalition project manager.

The Successful Contractor will be required to assume full responsibility for materials and equipment employed in construction of the project and agrees to make no claims against the Coalition for damages to such materials and equipment except for that which is caused by the Coalition, their employees or agents. The Successful Contractor shall be responsible for storage of all materials purchased and turned over to him by the Coalition and shall receive all delivered items by suppliers at the job site or at a staging area to be furnished by the Successful Contractor.

The Successful Contractor shall clean-up and remove from the work site on a daily basis (or sooner if directed by the Coalition project manager) all rubbish and construction debris, resulting from his own work in the building. The Successful Contractor shall supply a dumpster or similar trash storage/removal device where a substantial amount of construction debris is generated. Upon completion of all work, the entire job site areas shall be left clean and free of trash, debris, mud, dirt, dust, scrap materials, and excess materials. Floors in radio equipment shelters and rooms shall be mopped and polished to the satisfaction of the Coalition project manager upon completion of installation and construction work.

The Successful Contractor shall coordinate the work of all the trades under his responsibility to insure that interference between electrical conduits, cable support trays, grounding wire, structural members, and radio system work shall be avoided so that the project is completed within budget and on schedule.

The Successful Contractor shall keep up-to-date marked-up prints of the Project Drawings. Markings indicating changes to the drawings shall be red or green and clearly visible. Two (2) sets of "As-Built" drawings shall be furnished to the Coalition project manager at the completion of the project. Project Drawings shall also be supplied on diskette reproducible on AutoCAD Release 12.0.

# 7.1.1 Grounding Systems

All power feeders and branch circuits shall contain an equipment grounding conductor which shall have green colored THWN/THHN insulation or green identifying tape at both ends and which shall be suitably terminated to an equipment ground bus or device screw terminal at both ends.

At any site at which building structural members are used for grounds, connections to those main structural steel members shall be made with exothermic "Cadweld", Burndy press or equivalent type connectors. Any paint or fire retardant material shall be scraped away down to bare metal (for good metal contact) before applying the connector. Surface preparation recommendations of the manufacturer of the exothermic welding process to be used shall be followed.

All connections to equipment room or shelter ground halos shall be made as straight as possible with a minimum number of bends. The minimum bending radius of any ground wire shall be one foot. Grounding of Radio Equipment Cabinets and associated Cable Trays shall conform to the latest version of the Lightning Protection Institute LPI-175 and LPI-176 codes.

A ground ring consisting of a #2 AWG solid tinned bare copper wire shall be installed in a trench at a depth of 24" below final grade or below the frost line (whichever is lower) at a maximum distance of 2 feet from the foundation of the equipment building where the equipment is installed.

If soil conditions allow, the ground ring shall be supplemented with copper clad steel ground rods. The ground rods shall have a minimum length of 8 feet and a minimum diameter of 5/8 inches. All ground rods shall be interconnected, including the AC power service and telephone ground rods, to form a ground grid with resistance of 5 Ohms or less.

If soil conditions do not allow ground roads to be placed, an equivalent, a supplemental system must be used.

The minimum requirements for the quantity of ground rods shall be based on the following:

- At least one ground rod at each corner of all equipment shelters shall be installed
- Rods shall be a minimum of 8' away from any structure foundation.
- The minimum distance between rods shall be 16 feet
- At least one ground rod shall be installed directly below the transmission line entry port
- The top of ground rods shall be 2 feet below grade

The ground rods shall be bonded to the external shelter ground ring using an exothermic welding process such as Cadweld.

It will be left to the discretion of the contractor to determine the type of connector to use in the welding process. The following two restrictions, however, shall be observed.

- An anti-oxidant compound shall be applied to the connection point after the bond is completed.
- All connections to the ground ring shall be such that the ground wires are as straight as possible with no sharp bends.

The exterior ground ring shall be bonded to a minimum 6" wide copper strap descending from the shelter's cable entry bulkhead panel. The copper strap shall be secured to the building exterior so as to eliminate wind vibration or flapping.

An internal ground ring (halo) shall be installed in all equipment rooms or shelters which consists of #2 AWG tinned bare solid copper conductor, running continuously along each interior wall, at a maximum of 6 inches below the ceiling. Insulated mounting standoffs shall be installed at a maximum separation of 2 feet to accommodate bends and avoid sag.

In each equipment shelter or room a transmission line bulkhead entry port(s) shall be installed directly beneath the ground ring (halo) at a point to be mutually agreed upon between the Successful Contractor and the Coalition. This bulkhead panel shall be manufactured by Polyphaser Corp. and shall be grounded to the ground ring or the ground bar described below. The Polyphaser bulkhead assembly shall be sized to provide 50% expansion capability (cable ports).

An internal copper ground bar shall be installed such that it is located directly beneath the transmission line entry port. The ground bar shall be wall-mounted on insulators, and shall be drilled to provide ground connections for equipment. The ground bar may be integrated with the cable entry panel. The internal ground bar shall be directly connected to the bulkhead panel and internal ground ring using an insulated #2 AWG stranded copper conductor and exothermic welding process.

The following bonding connections shall be made directly by exothermic welding to the internal ground ring (halo) using green insulated #2 AWG stranded copper wire (except where noted):

- Ventilation louvers and sheet metal duct-work
- Metal doors shall be grounded to the door frames (using 1 inch wide solid or braided copper flexible straps, and door frames shall be exothermically welded to the internal ground ring (halo) with green insulated #2 AWG stranded copper conductor.
- · Air conditioning and heating units.

- Telephone terminal block enclosure, telco repeaters and line surge protectors
- Generators may have a separate ground system that must be connected to the equipment via the internal halo ground ring. If the generator is outside the building, it shall be grounded to the outer grounding.
- The neutral shall be bonded to ground, at building power entrance only.
- All microwave and radio equipment, cable trays, and equipment racks.

All ground connections to equipment that are not exothermically welded shall use stainless steel fasteners with toothed lock washers and/or brass or bronze connection lugs. Paint shall be removed from any painted surface before ground connections are made.

The shelter external and internal ground rings shall be bonded together with #2 AWG bare solid tinned copper wire. The entrance to the equipment shelter ground system shall be made through a 3/4 inch PVC pipe terminated with bushings 6 inches above the finished floor (AFF) and 6 inches below finished grade (BFG). The PVC pipe shall follow the contour of the foundation. Each ground wire shall terminate at the corner ground rods and shall be bonded. The ground wire shall run vertically along the wall supported by 2-inch insulated standoffs similar to T&B, TY-RAP nylon standoff brackets (short). The PVC pipe shall be sufficiently filled with a duct sealing compound, O-Z/GEDNEY DUX1 or equivalent, through the interior side of the shelter (this compound will act as a water stop and moisture barrier).

# 7.1.2 Lightning Protection.

Texas is a lightning prone location, and it is the Coalition goal to reduce possible system damage and failure due to strikes or induced currents. The Successful Contractor shall adhere to current practices in providing protection to sensitive electronic equipment. At a minimum, the Successful Contractor shall comply with the following lightning protection practices.

# 7.1.2.1 Tower Lighting Control

All tower lighting controls shall be equipped with gas tube surge arrestors which will prevent a lightning strike to the tower or lighting system from back feeding into the electrical distribution system of the equipment shelter. This device shall shunt surges to the tower grounding system, and shall protect the tower lighting controller. An acceptable protector is Polyphaser IS-7WFU (single flasher unit) or IS-12WFU (dual flasher unit).

# 7.1.2.2 Radio Frequency Transmission Lines

Each transmit or receive transmission line shall be protected by coaxial surge/lightning protectors, Polyphaser IS-CT50HN, or equivalent, between the transmitter combiner output and the antenna. Lightning arrestors shall be grounded to the bulkhead panel.

On receiving antennas with a tower mounted amplifier, a Polyphaser IS-DC50LN series lightning arrestor or equivalent shall be installed in the transmission line

Control stations with outdoor antennas shall be equipped with a coaxial lightning arrestor, Polyphaser IS-50NX-C2, or equivalent. These lightning arrestors shall be grounded to a 5/8" X 8 foot driven ground rod by a #2 AWG tinned solid copper wire attached to the rod using exothermic welding. The grounding system used for the control station lightning arrestor shall be connected back to the building ground system at the power service entrance.

Each transmission line shall be grounded at a point above the bend required to exit the tower mounted cable ladder to the ice bridge leading to the radio equipment shelter or room. These grounds shall be installed in accordance with the manufacturer's specifications, and shall be sealed against entry of moisture at any location where the outer sheath of the transmission line has been cut or removed.

# 7.1.2.3 AC Power Supply for Electronic Equipment

All AC powered equipment to be installed in equipment shelters or rooms shall be equipped with a surge arrestor, MOV/gas tube combination, in addition to any surge protection equipment which may be installed across the shelter/room power mains.

# 7.1.2.4 Telephone Circuits

Fiber optic cable from the telephone company is preferred to copper.

All telephone company circuits or other twisted pair cable which may enter an electronic equipment room or shelter shall be equipped for electrical transient protection utilizing a device which will protect up to 150V, with a clamping voltage of 200Vpk and a response time of less than 5 nanoseconds similar to the Northern Technologies TMC-50, or equivalent. These arrestors shall be intrinsic to the punch blocks being used, and shall be grounded to the equipment shelter/room ground ring.

#### 7.1.2.5 GPS Receivers

If GPS receivers are used as frequency/time references in the simulcast system, the antenna line shall be equipped with a gas tube surge arrestor Polyphaser IS-MR50LNZ+6 or +15, or equivalent.

#### 7.1.3 Conduits and Raceways

All electrical wiring inside of the building/shelter shall be enclosed in EMT (electrometallic tubing) with compression type fittings (set screw type fittings are unacceptable). EMT shall be surface mounted in a neat, professional like manner. UL approved locknuts and grounding bushings (or EMT box connectors) shall be used at boxes and equipment enclosures.

All wiring outside of the building/shelter shall be enclosed in heavy wall galvanized rigid steel conduit with form eight gasketted fittings. Weatherproof grounding type hubs shall be used at boxes and equipment enclosures. All wall penetrations shall be sealed with weatherproof compounds.

Telephone Company cable(s) shall be enclosed in GRS conduit.

Flexible metallic conduit (UL "Sealtite" or approved equal) with UL fittings shall be used as final connections to all mechanical vibrating/rotating machinery (A/C units, heaters, motors, transformers, UPS, and generator set, etc.)

All new conduit routings shall be horizontally and vertically straight, neat in appearance, indicative of professional workmanship and shall conform to existing conduit routings. Where existing conduit supports are adequate, they shall be used. If new supports are required, they shall be installed at intervals in accordance with the National Electrical Code (NEC). Only structural members suitable for conduit supports shall be used; piping, HVAC ducts, etc. shall not be used for conduit supports. Conduit support intervals shall be based on the NEC Table 346-12.

The minimum size conduit shall be 2" diameter NPT trade size.

#### 7.1.4 Wiring and Devices

Power conductor insulation shall be color coded (with tape at each termination end). Identification shall be by color tape (black-phase A, red-phase B, blue-phase C, white-neutral and green-ground). Branch circuit conductors shall be labeled (using Brady or approved equivalent wire markers) at each end with the appropriate circuit numbers. Genset and A/C unit control wiring shall be labeled with the terminal numbers corresponding to the Successful Contractor's wiring diagrams to be furnished with the equipment.

All outlet boxes shall be metallic surface mounted types suitable for the quantity of devices enclosed. Faceplates shall match the outlet boxes. The outlet boxes shall be marked with the associated circuit and breaker box numbers. Outlet boxes which are fed by emergency power shall be plainly marked and identified. Orange outlets shall be used for circuits that are protected by UPS and generator, red outlets shall be used for any circuits that are protected by generator only.

Radio equipment 120 VAC from the UPS power panel shall contain separate identifiable white neutral conductors. Common or shared neutrals for these loads are unacceptable.

All wire for power, lighting, control and grounding systems shall be stranded copper with UL THWN/THHN 600V insulation, sizes as indicated. Minimum size for power shall be #12 AWG and minimum size for controls shall be #14 AWG.

Electrical equipment such as UPS, genset, A/C (air conditioning units), heater, etc. shall be wired in accordance with the manufacturers wiring diagrams furnished with the equipment.

#### 7.1.4.1 Commercial Power

The Coalition will assist in arranging for commercial power installation to the meter at each base station/microwave radio site. The Coalition will negotiate a utility easement or right of way, if needed, at each site.

The Coalition will provide each communication site with a transformer that will not be shared by any other devices or buildings. Dual feed AC service will be provided at key sites.

The Successful Contractor is responsible for all power installation on the equipment side of the meter. Power feeds to shelters shall be buried and shall enter the building through conduit and an elbow described in the equipment shelter specification. If a main cutoff switch is required outside of the shelter, this switch shall be padlocked with a Best lock keyed to the Coalition's specification.

#### 7.1.5 Ground Resistance Testing

A component of the system acceptance test plan to be completed by the Successful Contractor will be the testing of all grounding systems installed, or utilized, for equipment associated with this procurement. This includes grounding at all base stations, control stations, communication centers, and microwave terminal/ repeater sites associated with this procurement.

All grounding systems (either using the main building steel, existing ground system in the Austin Police Headquarters or Travis County Buildings; or those installed with communication equipment shelters) shall be tested using an AEMC or equivalent clamp-on ground resistance tester or Biddle 500V Null Megger or equal (3-terminal fall-of-potential method). The resistance to ground of all tie-in connections to the building's ground sources shall measure 5 Ohms or less.

Ground tests shall be conducted in the presence of a Coalition installation representative, and results shall be recorded on a form approved by the Coalition project manager. These forms shall be included as a part of the acceptance test

documentation and are a component of final acceptance of the radio communication system.

# 7.2 Scope of Work

The Successful Contractor shall be responsible for the following:

- Procurement or furnishing of all services, and furnishing and installing all materials, necessary to complete the work
- Submittal for approval, all details, cuts, plans, and drawings of sites, site related equipment, and security/access control systems
- Disposal and removal from the site, of all debris and refuse that results from performing the work
- Applications for and obtaining all required permits, including FCC, FAA, building, electrical, soil disturbance, environmental, fire protection, or safety permits.
- Compliance with all applicable codes, ordinances, or regulations in accordance with the requirements set forth in the specifications

# 7.2.1 Sites at Which New Construction is Required

RCC has provided a list of potential mobile relay sites in this section. It is the desire of the Coalition to locate sites, to the greatest extent practical, on property or existing tower sites that are owned by Coalition entities.

The standard configuration for sites will be to:

- Serve as a base repeater site on the trunked radio system and a future mobile data system
- In some cases, to house NPSPAC mutual aid channel base repeaters
- To house conventional VHF or UHF base stations used for dispatch and alerting or mutual aid purposes
- To support a loop microwave system or GAATN interface to interconnect the proposed sites
- To provide sufficient expansion capability to support future growth or new technologies.

 Sufficient additional space will be provided on the tower and in the radio equipment shelter to allow for future expansion of the trunked radio system, to permit additional uses by the Coalition, and to accommodate equipment from adjoining counties and communication tenants.

Generally the work to be performed by the Successful Contractor at each site consists of the following:

- Furnish and install an electronic equipment shelter and foundation
- Furnish and install a guyed or self supporting communication tower and necessary base and or guy foundations (as needed)
- · Prepare plans for site civil improvements
- Install electrical service into the radio equipment shelter
- Install trunked radio base station repeaters, transmitter combiners, receiver multicouplers, and accessories
- · Furnish and install NPSPAC mutual aid repeaters and accessories
- Install microwave radios, antennas, transmission lines, loop switches, channel banks, alarm and monitoring equipment, service channel, and accessories
- Construct concrete fuel tank pads, and walkway to the shelter entrance
- Install antennas and transmission lines
- Install microwave antennas and transmission lines (as needed)
- Perform site preparation and improvements, including road improvement, grading, installation of fencing, installation of grounding system, installation of a fuel supply for the emergency generator to be installed at the site
- Furnish and install a standby power generator, automatic transfer switch, and fuel supply
- Furnish and install an uninterruptible power supply to provide power conditioning and standby service to critical electronic equipment
- Furnish and install a site alarm system

#### 7.2.2 Available Sites

The following sites are available for use in the new trunked radio system. The Coalition would prefer to use sites owned by the Coalition with existing towers on them. If the existing towers will not work at a location that you wish to use in your configuration, then you shall include and detail the costs associated with removing the existing structure, if necessary, and constructing the new tower with your required height. The new tower shall conform to the requirements in Table 1.

If there are no suitable tower sites owned by Coalition entities in an area where you require a site, then you may propose a new site on undeveloped property owned by a Coalition member entity.

Where undeveloped sites are chosen, the Successful Contractor is responsible for all improvements needed at the sites. Improvements may include clearing, grading, drainage, erosion and sediment control, access road construction, design and construction of foundations for the radio equipment shelter, tower base or foundations, tower guy anchors, generator fuel tank pad, a sidewalk between the fence gate and the equipment shelter, installation of foliage control measures, and installation of steel gates across access roads. Installation of a chain link fence around the equipment shelter, tower, and around each guy anchoring point is required. Electrical service and telephone circuits will need to be brought into greenfield sites during preparation.

If there are no suitable properties owned by Coalition members in an area where you require a site, then you may propose a commercial site for use. You will provide a new shelter at that site to be used only by the Coalition, with it's own backup generator. You will provide a description of initial and recurring site costs for a period of ten years from system acceptance. These costs will be factored into the evaluation.

Site coordinates and site elevations provided in the following table are accurate to the best of the Coalition's knowledge. However, proposers are responsible for verifying the particulars of any site included as part of their proposed system design.

#### PREFERRED REPEATER SITE LOCATIONS

Site Name		Coordinates	Site Elevation	Tower Height/ Type	
1)	Mt. Larson 1200 Mt. Larson Rd.	30-18-32.3 N 97-47-37 W	916'	300' SS	
2)	Four Points 10507 FM-2222	30-23-25,6 N 97-50-37.9 W	1050'	300' SS	
3)	Martin Hill 14914 Burnet Rd.	30-27-30 N 97-42-05 W	924'	300' SS	
4)	Davis Lane 3402 Davis Lane	30-11-40.9 N 97-50-23.9 W	864'	300' SS	
5)	Ridge Oak 4500 Ridge Oak Drive	30-19-47 N 97-46-12 W	865'	100' SS	
6)	South Service Center Yard 3615 S. 1st Street	30-13-52.8 N 97-46-09 W	669'	220' Guyed	
7)	Harold Court 6301 Harold Court	30-16-01.73 N 97-40-20,84 W		60' Pole	
8)	Police Headquarters 715 E. 8th Street	30-16-03.3 N 97-44-06.0 W	469'	5-Story Bldg.	
9)	Travis County Executive Office Building 411 W. 13th	30-16-34 N 97-44-41 W	568'	11-Story Bldg.	
10)	Bergstrom Air Force Base FAA request pending for two potential sites)	N W			
11)		30-19-36.4 N 97-37-34 W	65'	Tower (potential site for taller self- supporting tower)	
12)	City of Austin Fleet Communications 1006 Smith Road	30-15-01.8 N 97-40-54 W	120'	Tower	

# 7.2.3 Renovations & Upgrades

Depending on the final site selection and configuration, renovations are required support the trunked radio system and the loop microwave backbone system at each of the existing locations.

Vendors are responsible for assessing tower suitability, and including necessary upgrade or replacement costs in their proposals.

The following sections describe the function of, and intended scope of work at, each of the preferred sites. This information is provided in order for the Offerors to estimate the required effort needed to develop this radio system, and so that the proper Offerors' personnel may accompany the Coalition staff on the site visits.

# 7.2.4 Electromagnetic Compatibility Studies

The Successful Contractor is required to perform an Electromagnetic Compatibility study of each site at which equipment associated with this procurement will be installed. The study shall consider the effects of transmitter and receiver intermodulation, transmitter noise, and receiver desensitization between and among existing and proposed stations. The output of this study and recommendations shall be provided to the Coalition for its review and approval.

Any isolators, bandpass, band reject, crystal filter, lattice filters, relocation of base station or receiver antennas, or other measures required to minimize the effect of any potential interference shall be provided, including installation, by the successful contractor.

#### 7.3 Tower Site Work

Following installation, vendors will perform RF radiation measurements at each site and ensure compliance with the Office of Engineering and Technology (OET) Bulletin #65.

The following tasks are specified for any site at which tower erection, modification, or equipment shelter installation is required:

#### 7.3.1 Summary of Work

Site work includes:

- · Clearing, earthwork, excavating, backfilling, compacting and grading
- Construction of access roads and drainage, including installation of stone base and surfacing and erosion control measures
- Installation of fencing and security gates
- Foundation design and installation

- Delivery and installation of shelters, including sidewalks, grounding systems, security systems, and ancillary equipment.
- Delivery and installation of generators and fuel tanks, including filling of the fuel tanks.
- Construction of towers as specified, including soil exploration, geotechnical report, foundation design and construction, tower marking and lighting, grounding, and installation of antennas, transmission lines, cable ladders, waveguide bridges, anti-climbing devices, climbing ladders or step bolts, and related equipment.
- · Coordinate installation of electrical power to the site
- · Permits and approvals required for site work
- · Coordinate telephone line installation

# 7.3.2 Stone Surfacing

The Successful Contractor shall install stone surfacing within the fenced-in site area. Material shall be 3/4" broken stone with 10% binder material. Two layers of polypropylene liner shall be installed under the stone for foliage suppression. Prior to laying of any material, an EPA approved defoliant shall be applied over the area.

#### 7.3.3 Fencing

The Successful Contractor shall provide chain link fencing and gates for the sites. Fencing shall be an 8' high, 9 gauge, 2 inch zinc coated diamond mesh. Corner, line posts and gate posts (2½", 2" and 4" respectively) shall also be hot-dipped galvanized. Top rail brace (1¼") and truss rods (3/8") also are required.

The mesh fencing material shall be secured to terminal posts using stretcher bars and steel bands and line posts using wire clips.

The top of the fencing shall have concertina (razor) wire with 45° extension arms pointed outside the fence area. Gates shall be provided with a positive latching device to be secured by padlocks. A plunger rod and catch shall be installed to secure the gate in the open position.

Fence posts shall be bonded to the site grounding system using an exothermic welding process (Cadweld).

# 7.4 Tower Specifications

#### 7.4.1 Reference Standards

Unless otherwise modified herein, materials, design and construction procedures shall be in accordance with Electronic Industries Association (EIA) standard EIA-222-F, Federal Aviation Administration (FAA) Advisory Circular AC 70/7460-1G or latest version, concrete standards and all applicable local codes.

#### 7.4.2 Submittals

The Successful Contractor shall prepare and submit for approval, scale drawings of the tower depicting its overall height, the number and height of sections, the horizontal spread of each section, guy points (if applicable), antenna loading at specified heights and obstruction lighting details.

The Successful Contractor shall submit for approval a profile view of the tower, containing structural details and engineering notes. Any documentation on the tower needed by the County for planning approvals shall be supplied.

Drawings shall be sealed by a registered professional engineer (structural) licensed by the State of Texas

#### 7.4.3 Antenna Towers

Materials: Hot-dipped, galvanized steel. All steel materials used in the

construction of the towers shall be new, and shall conform to the provisions of EIA-222-F with respect to physical properties, manufacture, workmanship and factory finishes.

**Height:** Tower heights, excluding appurtenances, shall be identified by

the proposer.

Loads and Stresses: The design of the tower shall take into account dead and live

loads induced by the structure itself and all appurtenances, and all stress applied to the tower and its appurtenances by wind forces. The minimum safety factors listed on EIA-222-F shall apply under the most severe combination of dead load plus

live loading.

Appurtenances:

Appurtenances include, but are not limited to, the following: antennas, antenna mounts, antenna platforms, microwave antennas and radomes, lighting, transmission line, transmission line hangers, cable ladder, climbing ladder and safety device, lightning rods, conduit, waveguide bridge, lighting control, and ice shields.

Antenna & Transmission Line Loading:

The towers shall be designed to support, at minimum, the antennas and transmission lines described in Table -1.

Wind Loading:

The structures shall be designed for horizontal wind pressures induced by 120 M.P.H. basic wind speed with all appurtenances installed. Wind loading shall be calculated per EIA-222-F.

Iced Loading:

The structures shall be designed per EIA-222-F to withstand additional horizontal wind pressures and dead loading produced by the accumulation of ½" thickness of radial ice.

Tower Twist, Sway and Displacement:

Each tower shall be designed to meet twist, sway and displacement specifications for all loading conditions as recommended by EIA-222-F for the antennas specified in Table -1.

# 7.4.3.1 Transmission Line Support

Cable Ladder:

A transmission line cable ladder shall be installed along the inner side of one face of each tower (nearest to the building). The cable ladder shall be of galvanized steel construction, and shall have mounting hardware of stainless steel or galvanized steel construction. No drilling of the tower legs or cross bracing shall be required to install the cable support device.

Transmission lines shall be attached to the transmission line cable ladder using stainless steel hangers and adapters of the appropriate size for the transmission line supplied. Hangers shall be Andrew models 43211, 42396A-1,2,4,5,9 or equivalent. Andrew E Angle Adapter, or equivalent, kits shall

be used to attach the hangers to the transmission line support ladder.

Transmission line shall be supported on the cable ladder or ice bridge at intervals of not more than six feet, or as recommended for the wind speed design of the tower with ½ inch radial ice. (Andrew LDF5-50A, if used, shall be supported at intervals of 5.5 feet or less; LDF4-50A should be supported at intervals of three feet or less).

Waveguide Bridge:

A waveguide bridge/ice shield shall be installed between the tower and the equipment room/shelter to support transmission lines and to protect them from ice falling from the tower or antennas. The waveguide bridge shall be designed to accept support devices to properly attach the transmission lines at the intervals specified in Section 7.4.3.1. The waveguide bridge shall be supported by pipe columns if any horizontal span is 20 feet or greater, or if so required by local building codes. Galvanized steel construction shall be used for the waveguide bridge and its ancillary components. A grating type of waveguide bridge is required. Microflect waveguide cushions, hangers and crosses are the preferred method of attachment to the waveguide bridge.

#### 7.4.3.2 Lighting and Controls

Lighting:

The towers shall be lighted and/or marked in accordance with the applicable chapters of FAA Advisory Circular AC 70/7460-1G, or latest revision, as required by the particular Aeronautical Study performed by the FAA for each tower.

Controls:

Activation of any required lighting systems shall be via a light sensitive, photoelectric type switch and controller which will activate the lights at dusk (or other cloud darkened condition) and extinguish the lights at sunrise. If a dual lighting system is required at any site, the controller shall automatically switch from red lights at sunrise to strobe lights, and back to red lights when the sky darkens.

Wiring:

Wiring for the tower lighting shall be enclosed in rigid galvanized steel conduit, which shall be vented sufficiently to eliminate condensation buildup. Wiring and conduit shall be provided and installed in conformance with the tower manufacturer's specifications and in accordance with local electrical codes.

#### **Bulb Failure**

Indications:

The lighting control system shall be equipped to provide a single, form "C" dry contact closure alarm indication of bulb failure. Upon bulb failure, the alarm condition shall be reported by the master alarm system.

#### 7.4.3.3 Ice Shields

Each tower shall be equipped with steel mesh ice shields to be installed above each of the microwave antennas to protect them from falling ice. The ice shield shall cover the width and length of the microwave antenna it is intended to protect.

# 7.4.3.4 Climbing Ladder

Each tower shall be equipped with a climbing ladder and safety climbing cable system.

The climbing ladder shall be 18' off the ground, and each leg shall be screened to prevent climbing by unauthorized persons.

# 7.4.4 Scope of Work

#### Successful Contractor

Responsibility:

The Successful Contractor shall be responsible for providing the towers, designing and installing suitable foundations and all furnishing and installing all associated hardware and appurtenances, for performing all planning and installation of the tower, and for site restoration and cleanup. The Successful Contractor shall be responsible for ensuring that the tower meets all design criteria, labor services, guarantees and installation requirements contained in these specifications,

or in national or industry standards to which this specification refers

Purchaser's Responsibility:

The Coalition will provide an installation representative to coordinate field installation activities and to act as a liaison between the Successful Contractor, and the property owner.

Scope:

The work to be performed under this section of the specification shall include site preparation, tower erection, installation of antennas, transmission lines, lighting systems, ice shields, climbing ladders, cable ladders, waveguide bridges, antenna support brackets, platforms, tower foundations, tower lighting controls, lightning rods, grounding systems, guy anchors (if applicable), and touch up of any nicks in the galvanizing or paint.

#### 7.4.4.1 Construction

Soil Analysis:

The Successful Contractor is responsible for geotechnical exploration at the locations of each tower leg, tower foundation or guy anchor point. A geotechnical engineer licensed in the State of Texas shall be employed to perform soil exploration and analysis. A copy of the soil report prepared by the geotechnical engineer shall be furnished to the City by the Successful Contractor prior to commencement of work.

Foundation Design:

The proposal price for the foundation design will be assumed to be based on normal soil conditions. The final foundation design and price will be determined when the geotechnical report is provided to the Successful Contractor.

Site Plan:

A site plan shall be prepared for Coalition approval at each site at which construction of a tower or installation of an equipment shelter is required. The Successful Contractor shall install the tower and shelter in conformance

with the site plan. The Successful Contractor shall note that regardless of its size at the base, the tower shall be installed such that a minimum 10 foot spacing is maintained between the building and the tower face nearest the building.

Power:

The Successful Contractor shall be responsible for connecting to the commercial AC power at the meter. Temporary power may be required for the obstruction lighting on the tower during construction. The Successful Contractor is responsible for arranging and installing this temporary power. Temporary obstruction lights shall be installed while the tower is being erected.

FAA Notification:

The Successful Contractor is responsible for notifying the FAA of commencement of construction through the filing of appropriate forms. The Successful Contractor is also responsible for notifying the FAA when the tower has reached its greatest height, and when tower construction has been completed. Copies of these notifications shall be provided to the Coalition's Project Manager.

# 7.4.4.2 Painting

If an FAA Aeronautical Study requires any tower to be painted, the paint shall be applied at the factory and touch up painting is required at the site.

Touch-up galvanizing shall be done in dry weather. Galvanizing shall not be applied over wet surfaces.

# 7.4.4.3 Grounding

Grounding of the tower shall be in conformance with the specifications provided in ANSI/IEEE Std 142-1982.

# 7.4.4.4 Site Landscaping

The tower contractor will be responsible for landscape grading and seeding of the disturbed soil.

If planning authorities require foliage screening or other plantings at the tower sites, the Successful Contractor shall arrange for professional planting of the required species of trees or shrubs.

The Successful Contractor is to restore the site substantially to its original condition following construction and installation activities.

#### 7.5 Shelter Specifications

# 7.5.1 General Description

A prefabricated, bullet resistant, Electronic Equipment Shelter, foundation, and ancillary equipment shall be furnished and installed on a turn key basis as specified herein. It is the Coalition's intent to have the shelters arrive at the sites with equipment installed and ready to accept power.

#### 7.5.2 Reference Standards

Unless otherwise modified herein, materials, design and constructions procedures shall be in accordance with ANSI/NFPA-70, The National Electrical Code and all federal, state and local building codes.

# 7.5.3 Submittal of Plans and Drawings

The Successful Contractor shall prepare and submit for approval, 3 sets of engineering drawings of the shelter depicting its overall dimensions, electrical layout and general floor plan. These drawings will be used, as required, for obtaining zoning and building permits.

The Successful Contractor shall submit for approval a suitable foundation design based upon normal soil conditions. Final foundation design and cost shall be determined on receipt of a geotechnical report.

Drawings shall be sealed by a registered professional engineer licensed by the State of Texas.

#### 7.5.4 Shelter Features

Construction:

Construction shall be concrete aggregate exterior with 5/8 inch plywood interior walls. Roofing shall be designed to prevent penetration by ice falling from the tower at the site. The roof shall be sloped to prevent accumulation of water. Interior walls shall be designed to allow mounting of electrical and electronic equipment using standard fasteners available from local hardware stores.

Lighting:

There shall be sufficient interior lighting to provide a level of 75 foot-candles at 3 feet above the floor. Interior light shall be provided by fluorescent fixtures using two standard four foot tubes per fixture. The switch for the light fixtures shall be located inside and on the latch side of the entry door. Light fixtures shall be installed to the front and rear of electronic equipment racks to provide sufficient lighting for service personnel to perform equipment maintenance.

Exterior lighting shall be provided adjacent to the entry door to the shelter in a manner to avoid shading by the open door. This lighting shall be controlled by a photoelectric switch that allows automatic illumination and extinguishment at twilight and sunrise. Exterior lighting shall be heavy duty, shatter and tamper resistant.

Power:

AC power shall enter the shelter through an entrance elbow which can be rotated to accommodate connection to conduit from the power company feed. A main cutoff switch shall be provided inside the shelter, followed by a distribution panel which provides for a minimum thirty branch circuit breakers. The Equipment Room A.C. power shall be installed in EMT conduit with two duplex outlets mounted along the overhead cable ladder at the top of each equipment rack space, and at four foot intervals on each of the four interior walls of the equipment shelter (EMT conduit, grounded, duplex outlets). Each outlet shall be served on separate circuits. A minimum of two, or the minimum required by local electrical codes (whichever is greater) duplex outlets shall be installed in the

generator room of the shelter. Also, an outside duplex outlet connected to the generator shall be provided on each shelter.

AC power mains shall be protected by an all mode surge arrestor device. All electronic equipment in the shelter shall be equipped with transient voltage suppressors. The primary suppression system shall be silicon avalanche diode type, with MOV backup (Northern Technology Model TCS250BL or equivalent). It shall include a dry closure alarm relay, which shall be connected to the site alarm system.

An uninterruptible power supply shall be provided to provide continuous power to all equipment circuits. These circuits shall be clearly marked with orange outlets.

Outlets protected by the generator only shall also be provided, for tools or test equipment that may be used at the site and potentially cause a UPS circuit to trip because of a ground fault situation. Circuits protected by the generator only shall be clearly marked by red outlets.

All electrical equipment supplied shall be UL listed. The entire electrical installation and wiring shall be in strict compliance with the latest approved edition of the National Electrical Code and all state, city, county and local codes and ordinances.

Wind:

The shelter shall be designed to withstand wind speeds of 120 miles per hour.

# 7.5.5 Specifications

**Building Size:** 

Radio equipment shelters shall be sized to house a minimum of 90 trunked repeaters, 10 conventional repeaters, and 10 mobile data base stations. Ceiling height shall be a minimum of nine feet. A separate room shall be included for housing the standby generators described in Section 7.6.

Doors:

There shall be two exterior doors which shall be of steel construction with a solid core. A door will be provided for

entry into the equipment room and the second door for entry in to the generator room. Doors shall be equipped with a Best mortise lockset and a single cylinder deadbolt lock. All radio equipment shelters shall be keyed the same. Five sets of keys shall be provided to the Coalition. The lockset shall be protected on the exterior by an anti-prying plate. Hinges shall be tamper resistant to prevent removal of the pins from the outside of the shelter.

A drip awning shall be installed over each door to prevent water entry into the building.

Doors shall be sealed using adjustable weather stripping, and an adjustable saddle.

A/C Power:

The AC service shall be sized to accommodate the fully-loaded system (10 years) plus 20% reserve capacity.

HVAC:

Low ambient temperature air conditioning equipment shall be provided. Electric heat strips or other devices shall be provided which will maintain the interior temperature of the shelter between 55 and 85 degrees Fahrenheit when outside temperatures are -5 degrees Fahrenheit. Relative humidity shall be maintained at a level acceptable to the equipment to be furnished in this procurement.

There shall be two external vertical air conditioning units installed with a standard lead/lag switch arrangement set to cycle between the two units.

An auxiliary exhaust fan system shall be installed including motorized louvers, thermostat, timer, and hood with permanent expanded metal dust filter and exhaust insect screen.

Alarms:

The following alarm inputs associated with the site shall be installed and connected to the alarm system described in section 6.4.2.

- Site Controller Alarm
- Fire/Smoke Detector
- Intrusion Alarm (each door)
- Water Alarm
- High Temperature Alarm

- Low Temperature Alarm
- Power Failure Alarm
- Generator run
- Generator on-line
- Generator Alarm
- 800 or 900 MHz High VSWR
- UPS alarm
- Perimeter alarm (on fence perimeter)
- Tower light failure
- Spare alarms (10)

#### Waveguide Entry:

A minimum of eight waveguide openings, with 4 inch wall/roof feed through plates shall be installed at the end of the shelter adjacent to the waveguide/ice bridge from the tower, and in alignment with interior cable ladders arranged over the equipment rack space. (Polyphaser Earth Entry Port). The feed through plate shall be equipped with rubber boots, with galvanized clamps to seal the coaxial transmission line to be supplied pursuant to this procurement. Blank cable boots shall be used to seal all unused entry ports. A quantity of sixteen such blanks shall be shipped installed on the waveguide entry panel to prevent entry of birds, insects or rodents during shipping or installation of the equipment shelter. The waveguide entry port shall be attached to the exterior ground ring by #2 AWG solid copper wire or by copper ground strap.

Cable Tray:

A minimum 12 inch cable tray shall be installed over all equipment rack spaces, and to the telephone equipment panel, and to any future equipment expansion space in the shelter. Cable tray sections shall be bonded to one another and to the building ground halo by #2 AWG copper wire and compression fittings.

Security:

Ventilation openings shall be protected by security screens to prevent unauthorized entry.

Foundation:

The building foundation shall be concrete slab, and installed in compliance with local building codes. A concrete walkway shall be installed between the shelter entry door and the gate to the fence surrounding the shelter to allow equipment to be

brought into the shelter on hand trucks without tracking mud into the building.

Flooring:

Interior flooring shall be asphalt tile, mounted over concrete. Base moldings shall be installed around all perimeter walls.

# 7.6 Generator Specifications

Standby power generators shall be furnished by the Successful Contractor at all sites to be constructed pursuant to this procurement. Generators shall be mounted indoors in a separate room in the electronic equipment shelters in accordance with the manufacturers' specifications for shock and vibration mounting, ventilation, cooling, fuel supply and electrical connections.

# 7.6.1 General Requirements

Unless there are stand-by power generators presently installed at existing "Coalition-preferred Sites" which meet the stated requirements, it shall be the responsibility of the Successful Contractor to provide, install and test a complete and operable standby power generator and automatic transfer switch in each electronic equipment shelter to be supplied pursuant to this procurement. Equipment shall be new, factory tested @ 0.8 power factor for 3 hours, and shall be installed in the radio equipment shelter prior to delivery to the site.

#### 7.6.1.1 Documentation

The following documentation shall be supplied to the Coalition for each generator set and transfer switch supplied:

- Specification and data sheets for the exact type and model generator and transfer switch supplied pursuant to this procurement, including all options and accessories
- Manufacturer's certification of prototype testing
- Manufacturer's warranty documents
- Shop drawings showing plan and elevation views of the equipment

- Interconnection wiring diagrams showing all external connections required; with field wiring terminals marked in a consistent pointto-point manner
- Manufacturer's installation instructions
- Operator's and maintenance manuals that outline routine maintenance and trouble shooting procedures
- Transfer switch manual and wiring diagram.
- The above documentation shall be included in each copy of the asbuilt documentation delivered to the Coalition's Project Manager.

#### 7.6.1.2 Warranty

A no deductible warranty, which provides for on site service by a factory authorized service contractor, shall be provided. This warranty shall provide coverage against all defects in materials and workmanship for a period of one year from the acceptance date of the radio communication system.

# 7.6.1.3 Start Up Service

A factory authorized service representative shall provide initial start up service and shall conduct acceptance testing at each site at which the equipment is installed. Test records shall be furnished to the Coalition.

# 7.6.1.4 Type of Generator

Generators shall be either LP Gas or diesel fueled (as required by individual site requirements or building codes, etc), four cycle, engine driven sets with low reactance, brushless generator. Generator sets shall be equipped with a temperature compensated automatic voltage regulator with under speed protection function, a control panel, and high ambient temperature cooling system.

# 7.6.1.5 Generator Requirements

Ratings: Output power rating of the generator shall be sized to support

the full forecasted load of the equipment shelter plus 20%

reserve capacity.

Site conditions: Altitude-2,000 feet above mean sea level or less at each site

Ambient Temperatures—Equipment to be mounted in an equipment shelter which will maintain temperature in the generator room above 32 degrees Fahrenheit and below 120 degrees Fahrenheit.

Voltage Regulation -+ 2% of rated voltage for constant load between no load and full load

<u>Frequency Regulation</u>—.5% from steady state no load to steady state rated load

<u>Single Step Load Pickup</u>—100% of rated output power, less applicable derating factors, with the engine -generator at operating temperature.

Ambient Temperatures—Equipment to be mounted in an equipment shelter which will maintain temperature in the generator room above 32 degrees Fahrenheit and below 120 degrees Fahrenheit.

<u>Voltage Regulation</u>—± 2% of rated voltage for constant load between no load and full load

<u>Frequency Regulation</u>--.5% from steady state no load to steady state rated load

<u>Single Step Load Pickup</u>-100% of rated output power, less applicable derating factors, with the engine -generator at operating temperature.

#### 7.6.1.6 Generator Set Control

The generator shall be a remote start type compatible with the automatic transfer switch to be supplied pursuant to this procurement. Manual starting and stopping shall be provided from the control panel and from the City's Radio Shop, the Austin Police Dispatch Supervisor's consoles, and Travis County Sheriff's Office's Dispatch Supervisor's Console.

<u>Cranking control</u>—Shall provide a minimum of three cranking cycles of at least 15 seconds before lockout and activation of an overcrank alarm condition.

## Generator Protection Controls--(per NFPA 110)

The generators shall shut down and lock out upon:

- Failure to start (overcrank)
- Over speed
- Low lubricating oil pressure
- High engine temperature

Alarm contacts shall be provided to allow transmission of fault alarms for any of the above conditions, plus low oil pressure pre-warning, high coolant temperature pre-warning, low coolant, low fuel and an alarm indication when the generator set is running. These alarm contacts shall be wired into and shall be reported by the alarm system being supplied pursuant to this procurement. Form C alarm contacts shall be provided and connected to the alarm system to report loss of AC power, low battery voltage, high battery voltage, and power on.

Meters shall be provided to indicate output voltage, output current, running time, frequency/RPM. An AC rheostat shall be supplied for voltage adjustment.

# 7.6.1.7 Fuel Supply

The Successful Contractor shall supply a new, grounded and fully painted, LP gas or diesel fuel storage tank, (as required by site requirements, building codes etc), to be installed and secured to a concrete pad at a location near the equipment shelter and which is accessible for refueling.

The fuel tank shall provide sufficient fuel to provide seventy-two (72) hours continuous operation of the generator set at full load under low ambient temperature (0 degrees Fahrenheit). The tank shall be filled before conducting acceptance tests.

Fuel lines shall be buried below the frost line and at any point at which the line exits above grade, shall be insulated to reduce condensation at the regulator.

All necessary regulators, drip pots, piping, meters, or other supplies needed for an installation which meets local fire and building codes shall be furnished and installed.

The Successful Contractor shall supply a full fuel tank at time of System Acceptance.

## 7.6.1.8 Exhaust System

A residential grade exhaust silencer shall be installed on the generator. The exhaust system shall exit the equipment shelter through a thimble which protects the shelter from heat and vibration induced by the generator set.

## 7.6.1.9 Battery and Charger

A lead acid starting battery rated for the engine type to be supplied shall be furnished and installed with the generator set. This battery shall be float charged by a 10 amp voltage regulated charger which is powered by 120 volts AC. Float, taper and equalize charge settings shall be provided. The battery charger shall be located in the generator room.

# 7.6.1.10 Cooling System

A radiator cooled engine is required. The radiator shall be filled with a water and coolant mixture in accordance with the engine manufacturer's recommendations. A flange shall be provided which shall be attached to a duct to the outside of the equipment shelter to exhaust engine heat. A motor driven air intake vent shall be supplied in the equipment shelter

generator room which will automatically open on generator activation to provide cool air intake into the room at a volume sufficient to meet the generator manufacturers specifications.

A thermostatically controlled water jacket coolant heater shall be provided and installed in accordance with the manufacturer's recommendations.

#### 7.6.1.11 Base

The generator set shall be mounted on a heavy duty steel base which is anchored to the floor of the equipment shelter generator room. The base shall maintain alignment between generator set components and shall include vibration isolators.

#### 7.6.2 Transfer Switch

An automatic transfer switch which provides switching of the equipment shelter electrical load between commercial power and generator power shall be supplied and installed for each generator set. The transfer switch shall be completely factory assembled and shall contain electronic controls designed for surge voltage isolation, with voltage sensors on all phases of both input power sources. Permanently attached manual handles shall also be installed on the transfer switch. The switch shall provide positive mechanical and electrical interlocking and mechanically held contacts. Quickmake and quick-break contact mechanisms shall be provided for manual transfer under load.

The transfer switch shall be installed in a key locking, UL listed, NEMA cabinet to be mounted on a wall in the generator room of the electronic equipment shelter. The switch shall be fully wired and integrated with the engine generator set in accordance with local electrical and fire codes.

In addition, the successful contractor shall provide and install a connection and/or a manual transfer switch and all other necessary equipment for a mobile generator to be connected at each site for stand-by power requirements in the event of primary generator failure.

All transfer switches and accessories shall be U.L. listed and labeled, tested per U.L. Standard 1008 and CSA Approved.

## 7.6.2.1 General Specifications

Transfer switches shall be double throw, electrically and mechanically interlocked and mechanically held in both positions.

Main switch contacts shall be high pressure silver alloy. Contact assemblies shall have arc chutes for positive arc extinguishment. Arc chutes shall have insulating covers to prevent interphase flashover. Form C contacts shall be provided in each position for alarm reporting purposes. These contacts shall be connected to the alarm system for reporting transfer status.

The transfer switch shall be continuously rated for operation in ambient temperature ranges of -40 to +50 degrees Celsius. Transfer switches shall be rated to carry 100% of the rated current in the enclosure.

#### 7.6.2.2 Automatic Controls

Transfer switch control shall be solid state and designed for a high level of immunity to power line surges and transients. The device shall be tested in accordance with IEEE Standard 587-1980 (or latest revision). Controls shall have optically isolated logic inputs, and isolation transformers for AC inputs. Relays shall be installed on all outputs.

Solid state undervoltage sensors shall simultaneously monitor all phases of the standby power source and the commercial power source. Pick up and drop out voltage settings shall be adjustable. Voltage sensors shall allow for adjustment to sense partial loss of voltage on any phase.

Controls shall be provided with solid state overvoltage sensors, adjustable from 100-130% of nominal input voltage to monitor the source. An adjustable time delay shall be provided.

Automatic controls shall signal the engine-generator to start upon signal from normal source sensors. A time delay start, variable from 0 to 5 seconds, shall be provided to avoid nuisance start ups. Battery voltage starting contacts shall be gold, dry type contacts which have been factory wired to a field wiring terminal block.

The switch shall transfer when the emergency source reaches the set point voltage and frequency. A time delay shall be provided for transfer which is variable from 0 to 120 seconds.

The switch shall retransfer the load to commercial power after a time delay retransfer. This time delay shall be variable (adjustable) from 0 to 30 minutes to avoid short engine run times. The retransfer time delay shall be immediately bypassed if the emergency generator fails.

A control shall automatically signal the engine generator to stop after a time delay, which shall be adjustable from 0 to 10 minutes, the time starting on return to commercial power.

Power for transfer operation shall be from the source to which the load is being transferred.

Diagnostic indicators shall be provided to allow the last successful step in the sequence of control functions to be pinpointed. The present status of the control functions shall also be indicated. These functions, at a minimum, shall include:

- Source 1 OK
- Start generator set
- Source 2 OK
- Transfer timing
- Transfer complete
- Retransfer timing
- Retransfer complete
- Timing for stop

#### 7.6.2.3 Front Panel Control Devices

A key operated selector switch shall be provided which will provide the following functions:

Test-to simulate commercial power loss to allow testing of the generator set with or without transfer of the load.

Normal--leaves the switch in its normal operating position

Retransfer—a momentary position which will provide an override of the retransfer time delay and cause immediate return to the commercial power source (if available).

#### 7.6.2.4 Exerciser Clock

The transfer switch shall be equipped with an exerciser clock which allows setting the day, time and duration of a generator set exercise/test period. Tests under load or with no load shall be selectable.

#### 7.7 DC Power Systems

The repeater sites shall operate from a 24 Volt DC power source. The master site shall sustain full operation for a minimum 4 hour period. Any other repeater sites proposed shall also have battery plants sized for 4-hour operations. Options shall be proposed to reduce the backup operating time to 2 hours.

The battery systems shall utilize sealed lead-calcium cells and redundant charger components rated for telecommunication service. An automatic low voltage disconnect device shall be provided to protect the battery plants from discharge-related damage.

Repeater stations shall be housed in either open racks or, preferably, forced-air ventilated equipment cabinets. Cabinets, if proposed, shall be free standing and incorporate removable, hinged front and rear doors.

A maximum of four DC operated repeater stations shall be housed in any equipment cabinet. Each cabinet shall include redundant, metered DC/DC power converters sufficient to sustain the continuous operation of all four repeater stations.

Each repeater station shall incorporate a fused power distribution panel incorporating protection for power amplifier, exciter and receiver groupings.

The cabinet ventilation fan, if required, shall be DC powered and thermostatically controlled.

Each equipment cabinet shall be protected by a separate DC-power circuit breaker.

The primary battery chargers, low voltage disconnect and DC circuit breaker panel shall be installed in free-standing open relay rack units.

Likewise, the simulcast system controller, console/audio controller and dispatch/system manager console modem equipment shall be housed in free standing ventilated equipment cabinets similar to those used for repeater stations.

Each controller cabinet shall include a DC/120 VAC sinewave power inverter whose minimum capacity shall be 2.0 KVA. The inverter shall provide for both automatic and manual AC bypass operation.

Auxiliary site loads essential to proper system operation, i.e., tower-top preamp and receiver multicoupler, shall be interconnected to an inverter-protected AC power source.

The Contractor shall furnish all materials and labor necessary to complete the installation of AC and DC power systems at all backbone sites.

## 7.8 Uninterruptible Power Supply (UPS) Specifications

UPS systems shall be furnished by the Successful Contractor for all other sites and at any site with critical equipment which is not equipped with an existing UPS or DC power supply.

UPS systems shall have 2 hour battery back-up time and shall incorporate single phase input and output over current protection. A maintenance bypass switch shall be provided, and UPS units shall also be wired with bypass switches which allow the unit to be taken fully out of service allowing commercial power to be fed to the load. The system shall be "on-line" ferroresonant transformer technology or as an alternate static Pulse Width Modulated (PWM) technology. The UPS shall be UL 1778 and 1449 listed. Acceptable vendors are Best Power Technology Inc., Chloride Inc., or an approved equivalent.

## 7.8.1 General Requirements

It shall be the responsibility of the Successful Contractor to provide, install and test a complete and operable UPS system in each electronic equipment shelter to be supplied pursuant to this procurement. Equipment shall be new, factory tested and shall be installed in the shelter prior to delivery to the site.

#### 7.8.1.1 UPS Documentation

The following documentation shall be supplied to the Coalition for each UPS supplied:

- Specification and data sheets depicting dimensions, weight, location of conduit entry, grounding and wiring requirements and details for bolting assembly frames to floor
- Schematic wiring diagrams showing input and output protective devices and field connections, battery connections, interconnect wiring, controls and instruments
- Manufacturer's certified standard test data
- Manufacturer's warranty documents
- Manufacturer's installation instructions
- Manufacturer's Operating and Maintenance Manuals

## 7.8.1.2 UPS Warranty

A no deductible warranty which provides for on site service by a factory authorized service contractor shall be provided. This warranty shall provide coverage against all defects in materials and workmanship for a period of one (1) year from the acceptance date of the radio communication system. The batteries shall be warranted for ten (10) years - prorated basis from the date of shipment.

# 7.8.1.3 UPS Start Up Service

A factory authorized service representative shall provide initial start up service and shall conduct acceptance testing at each site at which the UPS is installed. Test records shall be furnished to the Coalition.

# 7.8.1.4 UPS Ratings

UPS shall be continuous, "On-Line, No-Break" static type employing the latest state of the art solid state components incorporating microprocessor based Pulse Width Modulated (PWM) technology or ferroresonant transformer design. The UPS system shall consist of free standing

cabinets consisting of a rectified section, inverter section, batteries, solid state transfer switch, isolation transformer, manual synchronized make-before-break bypass switch and input and output over current protective devices. Also included are all status and alarm displays, remote interface communicator (typically RS-232 type), control devices, meters, components, cabling and connectors. Alarm monitoring shall be remoted to one of the dispatch center Supervisor consoles.

UPS and associated components shall be housed in heavy duty re-enforced steel free-standing finished cabinets requiring front access only. Battery shall be housed in UPS or if necessary, matching cabinet.

UPS rating shall be 240 volt  $\pm$  10% single phase input and 120/240  $\pm$  3% single phase, three wire output, output frequency range of  $\pm$  0.01 Hz (or better), battery back-up time of approximately 120 minutes @ full load for 0.8 (lag) P.F. computer type loads. Temp. 0-40 degrees Celsius, Rel. Humidity 0 - 95% non-condensing, noise level: 60 dBA approx. @ 3' and noise reduction greater than 60 dB (normal mode) and 120 dB (common mode). UPS's shall be sized to support their designated loads,  $\pm$  25% growth.

## 7.8.1.5 Description and Operation

The capacity of the solid state rectifier section shall be sufficient to maintain the battery in a fully-charged condition and continuously supply the required load through the inverter while floating the battery.

The system offered shall not include any switching device or devices which will interrupt the continuity of power in any way.

The output voltage of the UPS shall be maintained within ± 3% over the nominal output voltage under any load conditions within UPS rating and ambient temperature range specified.

The sine wave output shall have a maximum of 5% total harmonic distortion over the entire range of output voltage at any load at any power factor.

Automatic Frequency regulation shall maintain the output frequency to within ± 0.1 Hz for all combinations of temperature, input voltage

variation and load variation. The output shall not follow the reference source beyond ± 0.3% Hz of nominal frequency. When input returns to normal, the UPS shall automatically synchronize to the line frequency.

The components shall be selected to provide sufficient voltage capability and ample current-carrying capacity to furnish reasonable margin for handling over-currents and minor voltage variations. In no case shall components be operated at more than 80% of the device's maximum steady state rating.

The UPS shall be capable of withstanding without failure, short circuit currents and surges of magnitude and duration in accordance with ANSI/IEEE Standard C62.41, categories A and B.

The UPS shall be capable of carrying 100% of the rated UPS output current continuously and shall be capable of carrying 150% of rated output current for approximately 10 minutes.

The system transient response shall be  $\pm 5\%$  from nominal peak voltage for 100% load step. Voltage recovery shall be within 4 mSec. to  $\pm 3\%$  of nominal voltage.

The battery system shall be of the lead acid maintenance-free sealed, non-gaseous type with a minimum ten (10) year life.

The rectifier shall maintain a DC output voltage regulation of  $\pm 1\%$  with a maximum of 2% RMS ripple. Rectifier shall be of the solid state full wave SC bridge design to limit AC wave-shape distortion on the power system.

As a minimum, over current protection (10KAIC circuit breakers or 100 KAIC C.L. Fuses) shall be provided for:

- AC Input
- Rectifier Input
- Inverter Input
- AC Output
- Battery Input

#### 7.8.1.6 UPS Accessories

The following items shall be mounted on the instrument panel of the UPS cabinet via microprocessor based LED or equal display (including lights/meters) for the following characteristics:

- Mode Select Switch (UPS Normal, UPS Bypass & Battery Modes)
- Input AC Voltage
- Battery DC Voltage
- Rectifier DC Voltage
- Output AC Voltage
- Output AC Amperage
- Output AC Frequency
- Synchronizing verification
- Low Battery DC Voltage Indication
- Static Switch Position Indication
- Manual By-Pass Mode Indication
- Float-Equalize switch/timer DC Circuit Indication
- % Rated Load Indication
- Battery back-up time available in Minutes.

The following conditions shall have audible and visual alarms in addition to dry contacts that shall be connected to the alarm system by the Successful Contractor:

- Low & High Battery Voltage
- Automatic By-pass operation
- Emergency Operation (UPS on Battery)
- Rectifier/Inverter Failure
- Common Trip alarm (form "C")

All external power and control connections shall be terminated on terminal blocks and identified clearly on wiring diagrams.

The UPS cabinet and battery cabinet (if not in UPS cabinet) shall be provided with a 1/4" x 1" copper ground bus with mechanical type lug connector for County's #6-#1/0 AWG copper ground cable. UPS manufacturer shall indicate on applicable drawing(s) requirements for

neutral-ground bonding per UL Listing qualifying as "Separately Delivered System" per NEC Art. 250.

#### TABLE -1

#### ANTENNA AND TRANSMISSION LINE LOADING REQUIREMENTS

The following antennas and transmission lines shall be considered for the tower design.

#### Operational Load

- 1 10 Ft. Antenna Platform mounted at the top level to support 6 vertical antennas (Bogner BMR-12 or equivalent)
- 1 10 Ft. Antenna Platform located fifty feet below the top mounted platform, designed to support 6 vertical antennas (Bogner BRM-12 or equivalent).
- 2 PCS/Cellular Antenna Platforms at 150 Ft. and 175 Ft. levels (12 panel antennas and three omnidirectional whips per platform)
- 3 DB-420 antennas mounted fifty feet below the second platform
- 3 DB-420 antennas mounted fifty feet below the above antennas
- 6 DB 411 or equivalent antennas at 335 Ft.(500' towers). 250' (400' towers) or 125' (300' towers)
- 4 Andrew P8-65E or equivalent antennas at 300', 275', 250', 225' (500' towers);
- 4 Andrew P8-65E or equivalent antennas at 275', 220', (2) 200' (400' towers)
- 4 Andrew P8-65E or equivalent antennas at (2) 225' and (1) 100' (300' tower)
- 4 Ice shields above the microwave antennas.
- 3 2' Parabolic antennas at 200 Ft. (500' tower); 125' (400' tower); 75' (300' tower)
- 3 1 meter Satellite antennas at 75 Ft. (all towers)

#### Cables

Andrew Corp. LDF5-50 or equivalent for antennas below 200 Ft.

Andrew Corp. LDF6-50 or equivalent for antennas 200 Ft. to 350 Ft.

Andrew Corp. LDF7-50 or equivalent for antennas above 350 Ft.

Andrew Corp. EW 63 or equivalent to microwave antennas.

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#### 8.0 INTER-SITE COMMUNICATION LINKS

## 8.1 Overview and Strategy

#### 8.1.1 Overview

This section describes the inter-site communication requirements. The members of the Coalition have access to broadband fiber and microwave networks. The Coalition is determined to utilize these networks to support the proposed Trunked Radio interfaces to Towers, Mobile Relay / Base Station Sites, Master Network Control and Dispatch Centers. The inter-site communication network utilized by the Proposer shall be designed for maximum reliability, and support additional growth and capacity for at least 10 years from the date of system acceptance. The Coalition is determined to provide maximum reliability in the implementation of the proposed radio network, utilizing existing resources and networks, where possible.

The Coalition has a desired strategy in utilizing the existing networks and is interested in proposals for 2 options, described below. The Coalition is asking the Proposer to develop an inter-site design for inter-site communication for each of the new tower sites using these strategies. As a component of the inter-site design, the Proposer must assert and respond in writing with justification, that the Coalition's strategy for inter-site communication meets/does not meet the Proposer's requirements. The Proposer should propose an alternate strategy; design and implementation plan if they do not agree with the intentions of the Coalition's strategy.

The Proposer shall propose interface requirements to connect both existing and new Trunked Radio Base Station sites to the inter-site network equipment. These requirements shall also include all interfaces required for operation, administration and maintenance. The Proposer must interface their equipment to the Coalition's inter-site network and the inter-site communication will become an integral component of the Proposer's overall solution.

The Proposer is being asked to develop an implementation plan for the inter-site communication. The Proposer may be asked to implement the inter-site communication. The Coalition reserves the option to utilize the Proposer's design and implementation plan and have the Coalition provide all products and labor required for implementation of the inter-site communication network.

The existing network resources are described below and are inclusive of an eight hop asynchronous digital microwave network, a fiber optic network with SONET and Packet Data technologies, and network management operation centers, systems and applications.

## 8.1.2 Inter-Site Strategy

The Coalition is interested in evaluating two options for inter-site communication.

## Inter-Site Option 1

The Proposer shall utilize the existing City of Austin GAATN fiber SONET network as the primary inter-site communication for the existing tower sites. For each new tower site, as required by the Proposer's solution, the proposal shall utilize SONET technology in their design for inter-site communication. The figure on page 4 of this section provides a conceptual drawing of what this option is attempting to accomplish. Note that this is not a design but presents a concept of the solution that the Coalition desires. This option "will include" the requirement to utilize the existing digital microwave network as a "backup intersite communication network" in the event of a catastrophic failure of the primary network.

The Proposer shall assume that the Coalition will provide microwave and/or fiber infrastructure, along with SONET multiplexing equipment to support any radio site or dispatch center that is currently being serviced by the existing digital microwave. The SONET network will be configured with a ring architecture and the Proposer shall design the entire inter-site network to maintain the ring architecture. The Proposer shall use the following guidelines in the design for option 1:

- Utilize either SONET fiber or SONET radio in a Unidirectional Path Switched Ring (UPSR) configuration.
- 2. It is desirable for extensions to be first, fiber and second, radio.
- Utilizing documentation provided by the City, determine the costs associated with extending the City SONET networks.
- Utilize and document associated cost elements to determine whether extensions shall be fiber or radio. (e.g. radio/multiplexer/tower costs vs. multiplexer/fiber costs)
- Propose requirements for interfacing the trunked radio to the SONET multiplexers.
- Perform path analysis, frequency coordination and obtain licensing for additional microwave links as required.
- Provide all tower/building structural analysis/design for existing and new sites.
- Provide all site/facility, analysis/design for existing and new sites.
- The Proposer shall provide a hardware/software design and implementation
  plan to allow the existing digital microwave network to be utilized as a
  "backup" to the primary SONET network.

10. The "backup" solution should be designed so a "switch" can be implemented with a minimum of downtime and a minimum of manual intervention.

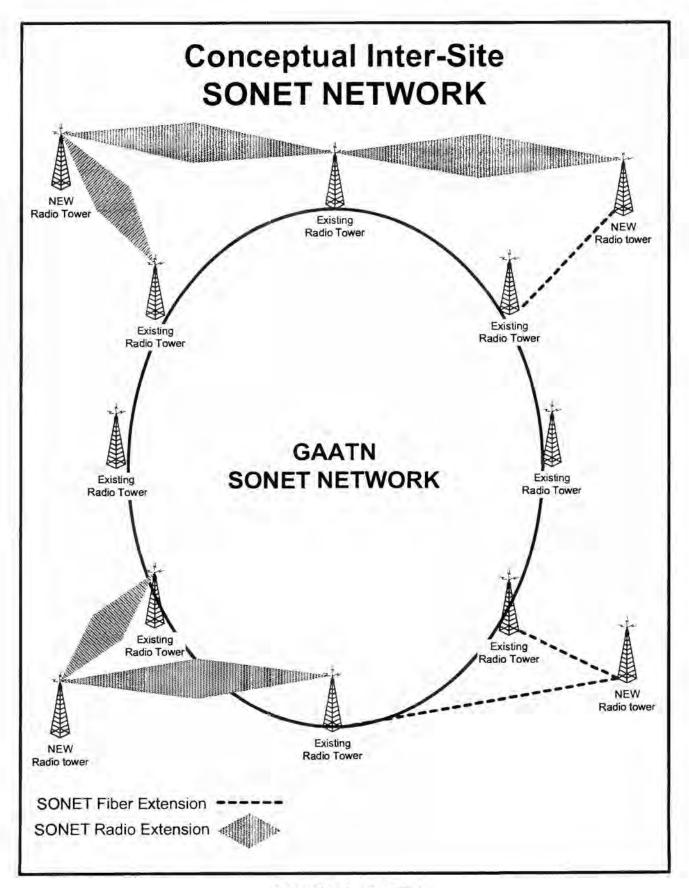
## **Inter-Site Option 2**

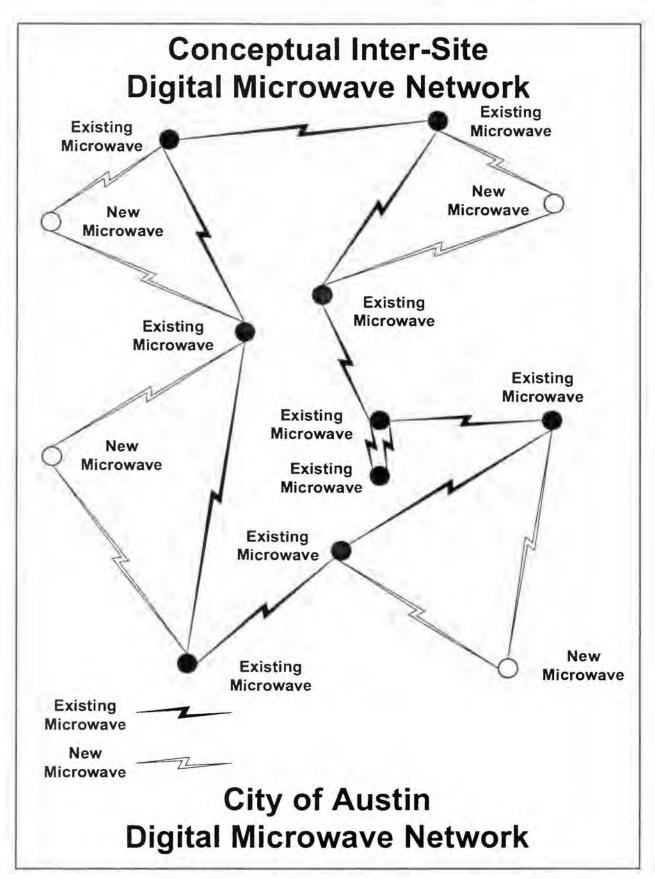
The Proposer shall utilize the existing City of Austin asynchronous digital microwave network as the inter-site communication for the existing tower sites. For each new tower site, as required by the Proposer's solution, the Proposer shall extend the digital microwave in their design for inter-site communication. The figure on page 5 of this section provides a conceptual drawing of what this option is attempting to accomplish. Note that this is not a design but presents a concept of the solution that the Coalition desires. This option will "not include" the requirement for a "backup inter-site communication network".

The Coalition is providing digital microwave, along with multiplexing equipment, at the existing radio sites or dispatch centers. The network is configured in a loop topology and the Proposer shall design the entire inter-site network to maintain the loop topology. The Proposer shall use the following guidelines in the design for option 2:

- Utilize documentation provided by the City determine the requirements for extending the network.
- 2. Design shall employ digital microwave in a loop configuration.
- Design shall utilize the same model, type and version of existing microwave and multiplexing, hardware and software.
- Propose requirements for interfacing the trunked radio to the asynchronous multiplexing equipment.
- Perform path analysis, frequency coordination and obtain licensing for additional microwave links as required.
- Provide all tower/building structural analysis for existing or planned or proposed tower sites.
- 7. Provide all site/facility, analysis/design for existing and new sites.

The following sections provide additional information regarding the City's existing microwave and fiber optic networks, network management systems, and requirements for additional inter-site communication links.





## 8.2 Existing Networks-Asynchronous Digital Microwave Network (DMN)

The purpose of this section is to provide basic information about the City's Asynchronous Digital Microwave Network (DMN) and to aid in your understanding in the microwave network's characteristics. The DMN is owned by the City of Austin and is currently utilized for inter-site communications to support the existing conventional, two-way voice and data network. This voice and data network is primarily utilized by the City's Public Safety Organizations: Fire, Police and EMS.

The City has extensive documentation of the network that shows the service area, node locations, site drawings, RF details including licensing, equipment layouts, and as build drawings. Technical specifications and other construction details about the DMN that Proposer's may utilize in preparing their proposals will be made available at a later date. All information will be released on a non-disclosure basis only!

## 8.2.1 Asynchronous Digital Microwave General Overview

The DMN is a private, non-commercial network owned and operated by the City of Austin. The network is 100% digital microwave and supports wireless voice and data in the Austin metropolitan area. The network consists of nine sites that are owned by the City including buildings, towers and licenses. The network was obtained in the process of FCC spectrum refarming. The City was licensed in the 2 GHz spectrum and during the "negotiation for voluntary relocation" phase of the spectrum refarming, entered into agreement with PCS Primeco. The agreement was to relocate the City's services out of the 2GHz to the 6GHz spectrum. The engineering design and implementation was provided PCS Primeco. The network is approximately nine months old.

The network is implemented in a loop configuration and is currently operating at approximately one-third of its total capacity. The network is dedicated to transport wireless voice and data services for the City of Austin. The network will support Voice, Data, and Video services for mobile applications, telephone switches, traffic control and surveillance systems, SCADA and telemetry devices and Information Technology systems and applications.

# 8.2.2 Asynchronous Digital Microwave Service Area

The DMN today serves primarily the Public Safety Sector of the City of Austin. The network provides wireless paths between nine sites in the Greater Austin Metropolitan Area. The nine sites are listed in detail in section 7 of this document and are as follows: Mt. Larson, Four Points, Martin Hill, Davis Lane, Ridge Oak, South Service Center Yard, Police Headquarters, Smith Road and Waller Creek Center.

## 8.2.3 Asynchronous Digital Microwave Topology

The network consists of nine sites of digital microwave and is constructed in a loop configuration. Each node on the network has a similar configuration and is comprised of identical types of electronic hardware and software. Buildings, Monopoles and Lattice Towers are the supporting structures for the placement of antennas. The towers on the network are in some instances shared with other entities and therefore the engineering design is particular to each site. In all instances the City owns the supporting structures and facilities.

The network consists of eight hops and the drawing on page 8 illustrates the point to point paths in a loop configuration. Active RF equipment is present at each of the nine sites except for Waller Creek, which is a passive repeater to facilitate RF paths between the hops from Smith Road to Eight Street and Ridge Oak to Eight Street.

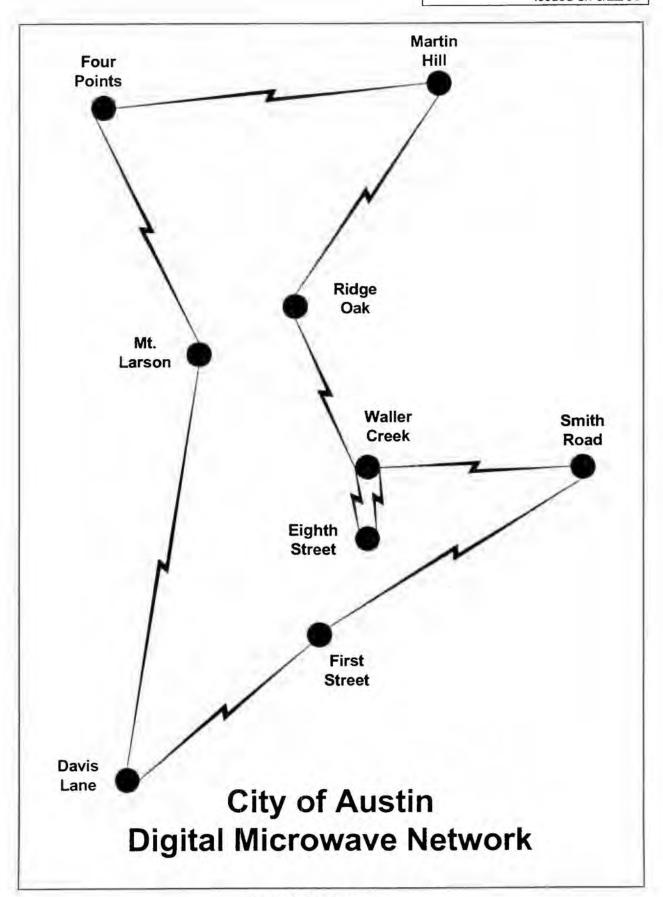
## 8.2.4 Asynchronous Digital Microwave Network Description

The digital microwave network is comprised of, NORTEL RD-U6C and RD-6C radios and operates in the upper and lower 6 GHz frequency band. The radios are capable of supporting 3-DS3 signals and are configured today with RF modules to transport 1-DS3 signal. This provides the system with an existing transport capacity of 672 channels, and is expandable to 2,016 channels. The Radios provide an additional 4 - DS1 wayside channels.

At each site, the radio in each direction terminates a DS3 output into a M13 multiplexer. Each M13 multiplexer terminates groups of DS1 outputs, (number of DS1 depends on channel requirements per site) via a DSX panel, into a DS1 protection switch. The protection switch provides the path choice for the looped configuration. The DS1 outputs from the protection switch are terminated into a Channel Bank (number depending on channel requirements per site). The Channel Banks are populated with E&M Voice Cards whose outputs are terminated on the conventional radios that comprise the existing two-way communications infrastructure. This configuration provides the protected loop architecture for the existing transport network. If option 2 is chosen for the intersite communication network the Coalition desires to maintain this protected loop architecture utilizing like equipment.

At each of the sites, except for Waller Creek, a Remote Terminal Unit (RTU) utilizes inputs form a variety of radio and multiplexer interfaces to provide Alarm and Monitoring functionality.

Power supplies are comprised of DC power supply/charger units with battery banks for backup. In addition at some sites generators are provided as well.



# 8.3 Existing Network - Greater Austin Area Telecommunications Network (GAATN)

The purpose of this section is to provide basic information about the GAATN, its partners and participants and the fiber optic network characteristics. The City has prepared extensive documentation of the part of GAATN that is owned and operated by the City. This documentation shows the service area, cable routing, node locations, and construction details of the outdoor plant. Technical specifications and other construction details about GAATN that Vendors may utilize in preparing their proposals will be made available at a later date. All information will be released on a non-disclosure basis only!

## 8.3.1 GAATN Partners and Participants

The Greater Austin Area Telecommunications Network (GAATN), is a private, non-commercial network that is owned and operated by seven governmental, educational, or non-profit, public sector entities or institutions. The participants;

- City of Austin (City)
- State of Texas General Services Commission (State GSC)
- Travis County (County)
- Austin Independent School District (AISD)
- Austin Community College (ACC)
- University of Texas at Austin (UT)
- Lower Colorado River Authority (LCRA)

have formed an administrative agency to manage the network, known as the Greater Austin Area Telecommunication Network Inter-local Agency and have developed and approved an Inter-local Agreement that defines the GAATN Network. The GAATN "Board of Directors" governs the network and the AISD is acting as the GAATN construction manager for the GAATN partners. Southwestern Bell Communications / Southwestern Bell Telephone (SBC), the local Regional Bell Operating Company (RBOC), is constructing the network. Co Com, an Austin based Engineering and Construction Company, is SBC's prime contractor for GAATN.

#### 8.3.2 General Overview of GAATN

GAATN is a 100% single mode, fiber-optic network that serves the greater Austin municipal area. GAATN is actually seven physically separate networks that share a common fiber trunk or sheath. The 300+ mile fiber-optic plant is configured in seven sub-rings that are linked by two super-rings. Each sub-ring services a different geographic area of Austin. The optical fiber plant is composed of two

types of cables, the ring cables and the building entrance cables. The ring cables contain 96 - 112 fiber strands, depending on the ring, and the fibers are specifically allocated to individual GAATN entities. The fiber strands of all entities are terminated at a single common location on the network, which is at the Treaty Oak Center, Network Operations and Control Center (NOCC). Each entity determines the nodes or splice points that they have on a particular ring. The splice points facilitate the attachment of the building entrance cables and ultimately terminations within a particular building.

The Electric Utility Department, on its distribution infrastructure, has provided construction rights-of-way. Rights-of-way will continue to be available to enable network changes and expansions. A great majority of the fiber optic plant is placed on utility poles, with approximately seven percent placed underground.

The network will support FDDI, SONET, ATM, and other broadband technologies that enable a number of mission-critical video, voice and data communication services and applications. GAATN can support most information technology (IT) systems and services such as mainframes, minicomputers, microcomputers, telephone switches, television studios, microwave & radio systems, traffic signal controllers, traffic control video surveillance and telemetry devices.

#### 8.3.3 GAATN Service Area

The network serves more than 300 public buildings and facilities, of which approximately 150 belong to the City of Austin. GAATN connects schools, colleges, universities, libraries, courts, airports, hospitals, major government buildings, fire-police-EMS stations, neighborhood health & recreation centers, convention centers, stadiums-auditoriums-civic centers, electrical power facilities, water wastewater plants & service centers, transportation facilities, radio towers, television studios and other public, governmental, or educational sites. Each individual entity deploys its own network technology on its own fibers and operates its portion of the network largely independent of the other entities.

In addition to the connected facilities, splicing points-of-presence (POPs) were constructed into the network. The POPs facilitate construction of future plant extensions and building entrance cables when the needs arise to connect additional sites. So far GAATN has proven to be a dynamic, ever-expanding network. New sites are being added to GAATN on a continuing basis as new City facilities come on-line. In some cases additions are for existing City facilities that need access to critical applications where once this level of technology was not required to support normal operations.

## 8.3.4 GAATN Construction Status

The estimated GAATN construction completion and acceptance date is October 1998. As previously mentioned, GAATN is very dynamic and is being expanded before the original construction is complete. For the purposes of this project, the vendors should assume the network construction is complete, fully tested, and accepted by the owners from SW Bell Telephone. Final acceptance of GAATN construction should have no impact on the project.

## 8.3.5 City GAATN Topology

GAATN is constructed in a multiple-ring topology. Refer to the drawing on page 14. GAATN is composed of two super-rings that interconnect seven sub-rings. A super-node is formed at the interconnection point of each sub-ring and the super-ring. The GAATN super-rings are constructed as two individual twelve strand fiber rings (SRN = Super-Ring North and SRS = Super-Ring South) and are colocated and interconnected at the GAATN Treaty Oak Center (TOC), Network Operations and Control Center (NOCC). The City has patched the two super-rings together at the NOCC (the single location where the super-ring is collapsed). Thus it is referred to in this document as a single super-ring (SR). However, future network applications may cause it to be useful to segment traffic between SRN & SRS and recreate the two super-ring topology. Two major network-intensive sites, the Traffic Control Center (TCC) and the Capital Area Planning Council (CAPCO), have also been connected to the super-ring (and therefore called super-nodes) to avoid overloading any sub-rings with these potential high-traffic sites.

The super-ring(s) is intended to be the "backbone" of the network and therefore will have a limited number of "building entrances" or nodes. The "super-node" locations will be the aggregation point on the network for sub-ring traffic that is required to pass to a point on another sub-ring or one of the high-traffic sites on the super-ring, TCC or CAPCO.

The GAATN sub-rings are constructed as eight, twelve strand, fiber rings (A1N - A2N - B1N - C1N - D1N - B1S - B2S) each serving a geographic area of the City of Austin. The City has patched the B1S and B2S sub-rings together forming a single sub-ring referred to as BS. The City currently has approximately 120 buildings attached to the sub-rings by extending the sub-rings into the buildings maintaining the ring topology. The sub-rings are interconnected with the superring at the "super-nodes", creating a RING of RINGS topology.

Below is a table of each super-node site and some basic information:

NAME OF SUPER-NODE SITE	SITE OWNER	SUB - RING CONNECTED
Treaty Oak Center	AISD	SRN / SRS / A1N / A2N
Waller Creek Center	CITY OF AUSTIN	SRN / A2N
Carver Branch Library	CITY OF AUSTIN	SRN/D1N
St. Johns Neighborhood Center	CITY OF AUSTIN	SRN/C1N
Department of Public Safety (DPS)	STATE OF TEXAS	SRN/B1N
Traffic Control Center	CITY OF AUSTIN	SRS / A2N
Manchaca Branch Library	CITY OF AUSTIN	SRS/C1S
WWW Paxton	CITY OF AUSTIN	SRS / BS (B1S & B2S)

Note that not all of the participating GAATN member's fiber strands are terminated at all GAATN nodes. Generally speaking, only fibers owned by an individual GAATN member are terminated in that entity's node or facilities. There are few exceptions to this principal. The Treaty Oak NOCC and most super-nodes are examples of nodes where more than one GAATN member's fiber terminate.

## 8.3.6 City GAATN Fiber Strand Location

The City owns 12 fibers throughout the GAATN network. The Interlocal Agreement provides that, when GAATN expansion is driven by a GAATN partner other than the City, the City is provided 12 strands in the new construction or expansion of the network. The fiber count of the City's building entrance cables is typically 24. The majority of the City's building entrances forms a collapsed ring as they contain both inbound and outbound fibers in that portion of the network.

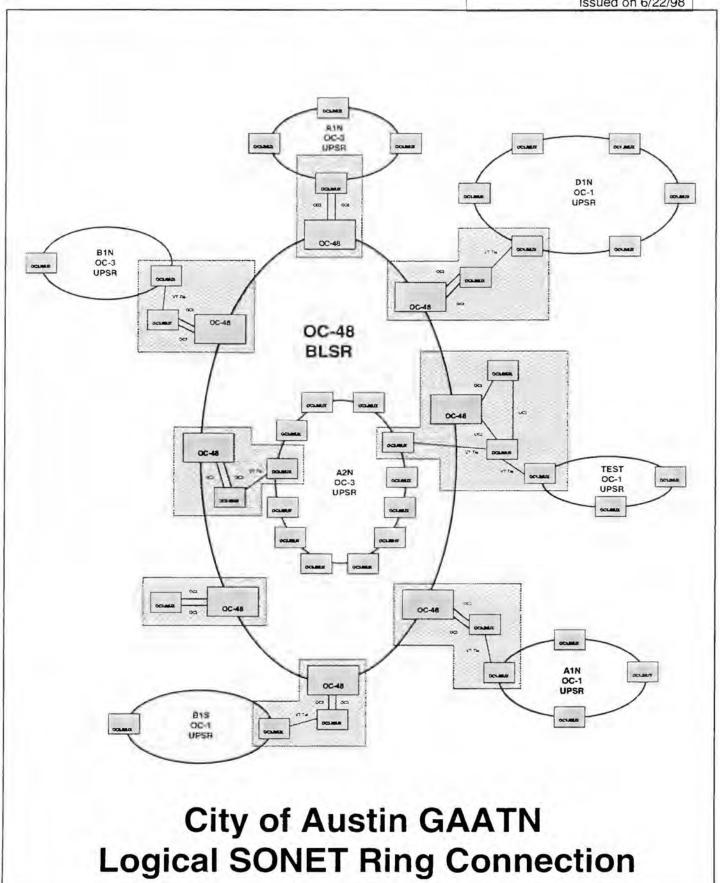
The strand allocation table for the super-rings is listed below:

STRAND#	SERVICE ALLOCATION	COMMENTS
1 AND 2	FDDI Network	Data network in production network-wide
3 AND 4	Testing / Maintenance	Permanent allocation for testing/maintenance
5 AND 6	Point to Point Services	For PT-PT services where HW limitations exist
7 AND 8	GAATN Interconnection	Inter-governmental Communication
9 AND 10	SONET OC - 12 / ATM	Reserved for future SONET/ATM Services
11 AND 12	SONET OC-48 Network	Nortel SONET OC-48 Network

The strand allocation table for the sub-rings is listed below:

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•	e		

STRAND#	SERVICE ALLOCATION	COMMENTS
1 AND 2	FDDI Network	Data network in production network-wide
3 AND 4	Testing / Maintenance	Permanent allocation for testing/maintenance
5 AND 6	Point to Point Services	For PT-PT services where HW limitations exist
7 AND 8	SONET OC - 12 / ATM	Reserved for future SONET/ATM Services
9 AND 10	SONET OC - 3	Reserved for OC - 3 SONET Sub-ring Services
11 AND 12	SONET OC - 1	Reserved for OC - 1 SONET Sub-ring Services



## 8.3.7 City GAATN FDDI Network Description

This section will describe the City of Austin GAATN FDDI network design characteristics and the deployment plan that was implemented over the past two years. This network may be made available for this project if the Proposer requires a traditional Ethernet interface in its solution. New applications are preferred to be TCP/IP based and the City will provide IP addresses from a registered "Class B" Network number.

The purpose of implementing the FDDI network was to provide high-speed (100Mbit) wide area network (WAN) data services to most City facilities. The FDDI network is a multi-departmental, multi-platform, multi-protocol enterprise network that supports a full complement of client-server and terminal-host communication services.

The core of the network is located in the Waller Creek Data Center and is designed for packet switching and routing utilizing Cisco Switches and Routers. Currently approximately 90 Cisco routers and 30 Cabletron bridges are operating at over 120 City sites on all of the GAATN FDDI rings. The routers and bridges provide connectivity for remote facilities and the technology on the Local Area Network (LAN) side is Ethernet. The network supports LAN interconnections, Internet access, mainframe terminal access, minicomputer terminal access, LAN file and pint services and client-server applications for more than 5000 users. The network routes the following protocols (TCP/IP, DECnet, IPX, AppleTalk, SDLC via IP tunneling) and bridges a multitude of layer 2 protocols including LAT, XNS and NetBEUI, among others. More installations are being planned at this time.

# 8.3.8 City GAATN SONET Network Description

This section is a description of the City of Austin SONET Network that will be implemented and active by September 1998. The network is a high capacity, survivable network architecture that can support a wide range of wide area network (WAN) services and information technology (IT) applications - from DS1 Voice and Ethernet Data services required today to more data-intensive Video and ATM services in the near future.

The SONET Manufacturer is NORTEL, which has a comprehensive, integrated product line that provides various levels of Optical Carrier (OC) rates. The goals of the network are to provide building blocks to support the development of services by providing the transport for voice, data, video and multi-media applications. The concepts for utilizing SONET mux's are as follows:

- SONET OC-1 (51.84 Mbps) mux's outfitted with the appropriate communication interfaces will be deployed at about 50 - 75 City facilities such as police, fire, and EMS stations, branch libraries, health centers, field service centers, etc.
- SONET OC-3 (155.52 Mbps) mux's will be deployed at approximately 25 of the larger City sites such as large office buildings, (that house television studios, host PBXs, and large numbers of City employees), convention and civic centers, traffic control and surveillance hubs, microwave / radio towers, etc.
- SONET OC-12 (622.08 Mbps) mux's may be deployed on certain sub-rings with very high traffic requirements.
- SONET OC-48 (2.48 Gbps) mux's will be deployed at supernodes (nodes that connect sub-rings to the super-ring), the Treaty Oak NOCC, the NCC, and the Traffic Management System (TMS) Control Center.

The City's communication needs assessment is an on-going process and the future bandwidth requirements of significant projects are unknown at this time. There are a number of future projects that may require integration with GAATN such as the Traffic Management System (TMS), Geographic Information Systems (GIS), the Public Safety Radio and microwave systems, the 9-1-1 system, the Police Computer Aided Dispatch (CAD) system, and Mobile Data Terminal (MDT) system. The network architecture and design will allow for such growth in the future.

The GAATN SONET system will initially be deployed with OC-48 mux's on the super-ring at 8 sites. These eight sites are the "super-nodes" and provide the interconnection with the sub-rings and additional mission critical, high-traffic sites. The Treaty Oak NOCC and the Traffic Control Center are connected to the super-ring to avoid unnecessarily overloading a sub-ring with traffic.

The sub-ring SONET nodes are equipped with OC-1, or OC-3 mux's depending on the traffic loading forecasted for the sub-ring. The fiber strand allocation plan allows for deployment of additional SONET rings paralleling the initial deployment as needs require.

#### 8.4 NETWORK CONTROL CENTERS

This section describes the important features and functions of the GAATN Network Operations and Control Center (NOCC), the City of Austin's Network Control Center (NCC) and Austin Energy's Energy Control Center.

## 8.4.1 GAATN's Network Operations And Control Center

The NOCC is located in the basement of the Treaty Oak Center (TOC) that is owned and operated by AISD. TOC houses the Austin Independent School District (AISD) headquarters. The NOCC is a node on 4 rings - SRN, SRS, A1N and A2N. It is located in a unique place in the network - where all GAATN members have fibers that terminate there. This characteristic makes it an ideal site for network interconnection to other GAATN member's networks for:

- · Inter-governmental communication
- Network inter-connections for Public Safety Applications
- Connections to other network providers for access to:
  - 1. Telephone Long Distance
  - 2. Internet Service Providers
  - Cable Television and Broadcast Services
  - 4. Competitive Local Exchange Services

The NOCC is a multi-use facility that is currently utilized by the following:

- · AISD's computer, telephone, and communication systems and equipment.
- GAATN members network equipment (Fiber Terminations and Network Hardware).
- AISD's network monitoring systems for their portion of GAATN.

# 8.4.2 City Of Austin's Network Control Center

The City of Austin owns Waller Creek Center (WCC), a ten-story building located in downtown Austin, adjacent to Interstate 35. The building supports the headquarters of the Water and Wastewater Department (WWW) and the City of Austin Information Systems Office (ISO).

The City's Central Data Center (DC) and the City's Network Control Center (NCC) are located on the tenth floor of WCC. The data center contains the central computing systems and voice communication systems (PBX's) that support a multitude of applications necessary for the operation of Austin's local government. In addition WCC contains the networks to support the computing

and voice systems and additional networks that support the needs throughout the City of Austin.

The facility is supported by two generators, one which provides backup power for emergency lighting throughout the building, and a second generator that provides continuous power through an uninterruptable power supply (UPS) to support the DC and the NCC.

The NCC is present on two rings - SRN & A2N. WCC has dual-building entrance facilities to increase survivability. The GAATN building entrance cables have been alternatively routed so that a collapsed ring is avoided. Therefore WCC could survive a single cut of a GAATN building entrance cable.

The NCC is the central operations and dispatch facility for the operations and maintenance of the networks for the City. Network analysts and technicians currently staff the NCC from 6 AM to 7 PM. Additional personnel are "on call" "7 X 24" to respond to "off-peak", business hour emergencies. The City may provide "7 X 24" staffing of the NCC in addition to the "on call" staff if service levels require this level of support. The staff has the necessary training, equipment, vehicles and tools required to operate and maintain the various media, hardware and software utilized by the city's networks.

The purpose of the NCC is to centrally monitor and manage most of the City's data, voice, and video networks. The NCC utilizes a number of network management systems to remotely view, test, and control a variety of network communication equipment. These systems are described in a later section.

# 8.4.3 City Radio Communications Control Center

The City Radio Communications group is located on Smith Road and the operations, maintenance and dispatch center for its network operations. The Radio Shop is owned by the City and contains the Asynchronous Digital Microwave Network Management System and voice and data systems necessary to support the facility.

A generator provides power via UPS to the Radio shop and the electronic equipment. The Asynchronous Digital Microwave is powered by a DC supply that is backed up by batteries and the generator.

The Radio Shop is staffed from 7 AM to 6PM, 5 days a week and "off-peak" service requests are managed with "on-call" staff "7 X 24". On call staff has access to remote administration and management functions.

#### 8.5 NETWORK MANAGEMENT SYSTEMS

## 8.5.1 City of Austin Spectrum Management System

The City owns and operates a comprehensive network management application and system that resides in the NCC on the 10<sup>th</sup> floor of Waller Creek Center. This management system is provided by Cabletron systems and is a Simple Network Management Protocol (SNMP) based application. This system utilizes the SNMP protocol over TCP/IP to provide proactive analysis for a variety of network hardware and software. The system also supports the Remote Monitoring (RMON) protocol over TCP/IP for network analyzer type functionality at a central location.

The system provides a graphical user interface (GUI) to the user and is very intuitive to use. The GUI interface provides graphical displays of the device, interface status', alarm conditions, device configuration, inventory management, statistics for traffic analysis and monitoring, software downloading to devices, etc.

The application, through the loading of SNMP Management Information Base (MIB) software can provide management for a variety of devices including, but not limited to, routers, bridges, switches, PBX's, terminal servers, channel banks, radios, CSU/DSU's, modems, application servers, network interface cards (NIC's), UPS's, Generators, etc.

This management platform currently supports the FDDI network, LAN Ethernet devices of varying Proposer products, CSU/DSU's, and UPS's. Access to the application is available via Remote Access and an X-Terminal interface to provide complete functionality from a Remote Location.

This management system is available for use by the Proposers in their design for system management if desired. All managed devices require a TCP/IP address provided by the City's Network Manager.

# 8.5.2 City of Austin SONET Management System

NORTEL provides a management application and system, Integrated Network Management (INM), for the Operation, Administration, Maintenance, and Provisioning of all of its SONET products. This system is an integrated high

performance system with a broad range of functionality. The system includes the ability to manage SONET compliant devices of any Manufacturer's products with software (Managed Object Agent, MOA) provided by the other SONET manufacturer. The system utilizes the "overhead" bandwidth within the SONET transmission structure to provide OAM&P "in band" with the traffic. This communication method enables all of the OAM&P functionality without the requirement of additional hardware, software or communication paths. The system will reside in the NCC on the 10<sup>th</sup> floor of Waller Creek.

The system provides at a minimum the following functionality:

- Software management (e.g. software downloads to devices)
- · Fault management (e.g. alarms, logs, performance monitoring)
- Provisioning (e.g. circuit path setup, re-routing of circuits)
- Inventory Management (e.g. Software versions, Hardware releases, serial numbers, physical location in network and chassis)
- Proactive analysis of problems
- · Remote Access via an X-terminal interface
- · WWW access via a Web Browser
- · Trouble Ticket generation and tracking

The system is capable of managing over 5000 compliant devices and up to 200,000 DS-1 circuits. The system is capable of managing multiple manufacturer products and multiple technologies such as:

- SONET/SDH
- ATM
- Central Office Switches
- Digital Video
- Radio
- Digital Cross-connect
- Digital Loop Carrier Access

The NCC staff will be trained along with network designers and planners to ensure that the functionality of this powerful platform is utilized to provide maximum efficiency and availability of the City's networks.

# 8.5.3 City Asynchronous Digital Microwave Network Management System

KASTEN CHASE Applied Research provides a management application and system, Communications Alarm Systems Control (CASC), to monitor the existing DMN. The "Master" system is located at the City's Radio Shop, Communications

Control Center, on Smith Road. A "Backup Master" system resides at the existing APD Communication Center equipment room.

The system utilizes the asynchronous "service channel" of the microwave to as a "party line", to poll and receive alarms from Remote Terminal Units (RTU's) that are placed at the radio sites and interfaced to the Radios, Multiplexing Equipment, Environmental sensors and site monitoring sensors. The "Backup Master" listens to the poll/response communications and if a loss of the poll/response communications is detected, the "Backup Master" assumes the role of the "Master" system. These RTU's provide Pass/Fail fault alarms for Receive Level, Transmit Level, Power Supply Status, and Channel Bank Interface Status, along with others. The system is capable of providing additional information with discrete inputs such as ambient temperature, humidity, water presence sensors, door open alarm, tower lighting alarms, etc. The system is also capable of controlling external devices (e.g. tower lights, generators).

The "Master/Backup Master", systems provide paging functionality to the Radio Shop Technicians to alert them of a "FAIL" alarm status. The Management Systems support remote access allowing authorized users to gain access to key control functions, view system status and alarms, and view alarm logs as if they were on-site.

The system can pass alarms and alarm logs to other management systems that use standard network management protocols for a composite view of network status. The Network Management Protocols are as follows:

- Simple Network Management Protocol SNMP
- Common Management Information Protocol CMIP
- Common Management Information Service CMIS

#### 8.6 SONET Extensions to Inter-site Network

#### 8.6.1 Introduction

This section describes the minimum requirements for inter-site communication to new sites required to support the proposed Trunked Radio to Towers, Mobile Relay / Base Station Sites, Master Network Control and Dispatch Centers. The requirements are for SONET Fiber or SONET Radio extensions and the Backup Inter-site Network. The design of the inter-site network shall meet the following performance objectives of the trunked radio system:

- · Support the trunked radio system being proposed by the Proposer.
- Support growth up to a total of 90 trunked channels/site

- Support up to 10 conventional channels/site
- Support diagnostic and alarm reporting from the various tower sites and communication centers
- Support a new mobile data system with up to 10 data channels per repeater site
- Toll quality voice transmission, as well as the transmission of data at 19.2 Kbps or higher

New paths required to support the Proposer's Trunked Radio solution shall be designed utilizing the "Inter-Site Strategy, Option 1" as described in Section 8.1.2 of this document. In summary, a new path for inter-site communication, shall be first, SONET Fiber and second, SONET Radio. Also this strategy requires the existing Asynchronous Digital Microwave Radio System to be utilized as the "Backup Inter-Site Communication Network". Depending on the design, the ring topology may be accomplished with a hybrid radio/fiber ring. They shall include at a minimum the following:

- · Antenna, line and mounting hardware
- Waveguide pressurization and dehydration equipment
- Loop-protected transmitter and receiver with automatic switchover
- Multiplex and channel interface cards to support the radio system
- Service channel to provide intercom between sites
- System to report alarms
- Power supply/charger and battery
- Racks and interconnecting cables

#### 8.6.2 Site Requirements

Site requirements shall be designed to comply with Section 7 of this document. These include at a minimum the following:

- · Power and Grounding Requirements
- Conduits, Duct and Pathway Requirements
- Environmental Requirements
- Antenna Towers and Support Structures

#### 8.6.3 Path Requirements

## 8.6.3.1 Radio Path Requirements

The Proposer shall be responsible for performing all aspects of the RF design required to support their proposed solution. The includes at a minimum the following:

- Provide Frequency Coordination
- Path and Site surveys to confirm
  - 1. Site coordinates
  - 2. Ground elevations
  - 3. Define tower requirements
  - 4. Calculate path reliability
- Proposers shall also provide the path engineering calculations based on the equipment being supplied. These include but are not limited to:
  - 1. Path fade margins
  - 2. Percent reliability/annual outage
  - 3. Received signal levels
  - 4. Parabolic antenna sizes and installation heights
- Path Clearance to be performed for Austin area
  - 1. K = 2/3 F = 0.3
  - 2. K = 4/3 F = 0.6
  - 3. K = 1 F = 1.0
- FCC Licensing

#### 8.6.3.2 Fiber Path Requirements

The Proposer shall be responsible for performing all aspects of the Fiberoptic path design required to support their proposed solution. The includes at a minimum the following:

- Determine Easement Availability
- Path and Site surveys to confirm
  - 1. Pole and Duct locations
  - 2. Attachment elevations and clearances
  - 3. Define guy requirements
  - 4. Calculate cable distances
- Determine splice locations
- Calculate estimated attenuation
- Design Building Entrances

#### 8.6.4 Routing Requirements

The Coalition desires that the SONET system be designed and supplied by the Successful Contractor in a diverse route, Unidirectional Path Switched Ring (UPSR) configuration, where possible, in order to provide redundancy and backup in the event of a failure. If it is not possible to maintain the diverse route, UPSR configuration, the Proposer shall propose other methods to provide enhanced path reliability (e.g. collapsed rings, space diversity, hardware protection, hot standby radios).

The Proposer shall determine the configuration in accordance with the sites selected, as required by their solution, to provide the required coverage. Refer to Section 7.2.2 – Available Sites, of this document that present the Coalitions preferred Repeater Site locations.

#### 8.6.5 SONET Requirements

The equipment supplied shall comply with all Rules, Regulations, and Standards of the FCC and FAA. The supplied equipment shall fully comply with the sections applicable to SONET for the following standards at a minimum:

- Bell Communications Research Technical Advisory TA-TSY-000842, Generic Requirements for SONET Compatible Digital Radio, July 1988.
- Bell Communications Research Generic Criteria for SONET Dual-Fed Unidirectional Path Switch Ring (UPSR) Equipment, December 1995

Proposed equipment specifications should comply with the stated requirements. However, if there is any disparity, the Proposer shall explain how the equipment satisfies the intent of the particular requirement, and how the end objective will be met. In all cases, the City of Austin reserves the right to enforce the stated requirements. In addition, the Proposer may be required to demonstrate compliance with any requirement.

## 8.6.6 SONET Multiplexer Requirements

At new tower sites the SONET Fiber or SONET radio (depending on path design) shall be interfaced to a NORTEL JungleMux at an optical line rate of OC-3 (155 Mbps). The JungleMux shall have the capability to terminate all of the available bandwidth at a single site within a single JungleMux with interface shelves in an add/drop configuration. The traffic may be a mix of the following interfaces or may be all of one type. All interfaces shall be implemented as native interfaces

within the JungleMux multiplexer shelves. The Proposer shall provide options for interface protection strategies.

#### 8.6.6.1 Multiplexer Interface Requirements

The interfaces available on the JungleMux for the Proposer to utilize for their design include the following:

- OC-3 / OC-1 @ 1310nm or 1550nm
- DS-1
- 4 Wire Voice Frequency E&M
- · 2-Wire FXS
- 2-Wire FXO
- · 2-Wire to E&M
- Low speed data RS-232 at 9.6 Kbps, 19.2 Kbps, or 38.4 Kbps
- High speed data RS-422/V.35, 56/64 Kbps Synch/Asynch
- 802.3 Ethernet

#### 8.6.6.2 Built in Test requirements

Each multiplexer assembly shall perform the following functions as a minimum:

- VF loopback, using the add/drop multiplexer
- DS1 loopback, local and remote
- BER

#### 8.6.6.3 Service Channel Requirements

The service channel shall be provided for in the SONET overhead. These digital channels shall provide for a minimum of two RS-422 data circuits. The service channel shall be implemented with an interface on the Multiplexer.

#### 8.6.6.4 Orderwire Requirements

A VF Service Channel shall be equipped at all stations. The order wire shall be either bit-stuffed or carried on the SONET overhead so as not to use traffic signaling capacity. The service channel shall operate in the broadcast mode from any communication site.

The orderwire shall include jacks for a speaker and handset. If the local repeater station is "on hook," the digital service channel shall not convert the digital signal to analog and back to digital; instead, the digital signal shall be converted to analog for listening and DTMF detection, and also pass digitally through the station.

In the event of a path failure at any site (in a ring system), the orderwire should continue to function around the ring. A failure of a single site should not interrupt orderwire service between other functioning sites. A break or malfunction of any site that prevents orderwire communication between any two functioning sites in the ring is not acceptable.

#### 8.6.6.5 Local and Remote Monitoring and Configuration

The INM Network Management System (NMS) allows for the user to monitor and configure all systems from the Central Management Console. Visibility of nodes is down to the DS0 level, which includes monitoring, configuration and alarm reporting. Manual path switching is also available. Loopback and hardware protection switching is available. Craft interfaces are provided that allows monitoring and configuration of all parameters on all nodes from a locally attached VT100 Terminal.

The Multiplexer shall provide local indicators on all interfaces for visual status indication.

### 8.6.6.6 Synchronization and Timing Requirements

System synchronization follows the Bellcore standard "line timing" method. Line timing implies that there is a node assigned as "Headend node" that provides the reference clock for the entire system. All other nodes on the system are "Normal" and receive their sync source from an incoming signal. The City will provide a Primary and Secondary, minimum Stratum 2 level clock for synchronization.

#### 8.6.6.7 Power Requirements

A JungleMux Power unit provides the interface between the customer supplied station battery and a JungleMux node. The unit provides the regulated +5V required for the JungleMux shelf by converting station battery input to +5 VDC. Input power requirements can be 24, 48 or 130 VDC depending on unit option. The Power unit can be paralleled with another unit to provide redundancy in case of a single unit failure.

#### 8.6.6.8 Environmental Requirements

- The JungleMux system has been designed to operate under harsh environments. This includes temperature extremes as well as RFI and EMI.
- Operation is guaranteed over the extended ambient temperature range of -20 to +60 C (-5 to +150 F)
- All external metallic interfaces to the system, be they signal (voice, data), power or alarm & control are capable of withstanding fast surge voltage transients of 4000 volts per ANSI/IEEE C37.90.1
- The system also meets ANSI/IEEE C37.90.2, which is specified for RF interference immunity.

#### 8.6.7 SONET Radio Requirements

New SONET Radio paths shall be a NORTEL S/DMS Transport Node OC-3 (155 Mbps) Radio. The radio shall be 6 GHz SONET digital microwave configured in a Unidirectional Path Switched Ring (UPSR) and/or Hot Standby Radio depending on network design.

#### 8.6.7.1 SONET Radio Interface Requirements

The SONET Radio provides RF transmission paths at the Lower 6 GHz band and general specifications are as follows.

Frequency Band: 6 GHz

Channel Capacity: OC-3 (155 Mbps) + 4 – DS1 wayside

Channels

Propagation Reliability: 99.9999%, per hop

System Availability: 99.999%, end-to-end, between any two

locations in the network

The waveguide interfaces provide one waveguide interface for the transmit network and two waveguide interfaces for the receive network. The waveguide type used is WR137 with a CMR137 Flange.

Digital interfaces are as follows:

- OC-3 @ 1310nm
- Service Channel two asynchronous channels RS-422 @19.2Kbps

The Proposer shall provide options for interface protection strategies.

#### 8.6.7.2 Built in Test requirements

Each Radio assembly shall perform the following functions as a minimum:

- Local IF loopback, both before and after the Adaptive Slope Equalizer.
- BER on transport paths

#### 8.6.7.3 Service Channel Requirements

The service channel shall be provided for in the SONET overhead. These digital channels shall provide for a minimum of two RS-422 data circuits. The service channel shall be implemented with an interface on the Radio.

#### 8.6.7.4 Local and Remote Monitoring and Configuration

The City's INM Network Management System (NMS) allows for SONET OAM&P operations in the SONET overhead. Visibility of all nodes is provided, which includes monitoring, configuration, provisioning and alarm reporting. Manual path switching is also available. The SONET radio shall be supplied with software to interface to the JungleMux Network Management Application. The Proposer shall integrate the JungleMux application with the City's NORTEL, Integrated Network Manager (INM). The INM shall provide OAM&P for all levels of the Radio including but not limited to:

- Transmitter Output Power, local and remote
- · Received Signal Level, local and remote
- Bit Error Ratio, local and remote
- Transmitter AGC voltage
- Receiver AGC voltage
- Power Supply voltage
- Fan operation status
- Transmit levels
- · Receive levels
- · Interface status for all interfaces
- Protection switching status

Local terminal interfaces shall be provided to allow local OAM&P functionality with a VT100 Terminal.

Serial and Parallel Telemetry ports shall be provided.

The Radio shall provide an LED on all interfaces for local unit status indication.

#### OAM&P Local Interfaces

- Craft Interface Terminal (VT100) RS-232 @ 9.6Kbps
- Serial Telemetry Port RS-485 @19.2Kbps
- · Remote Alarm Port

#### 8.6.7.5 Power Requirements

The Radio shall operate with input power of either +/- 24 Vdc, -48 Vdc depending on unit option and power plant design.

The Radio shelf shall include a Power Distribution Panel with breakers, alarm lights, and power distribution connections for the radio equipment shelves and interfaces.

## 8.6.7.6 Environmental Requirements

The Radio and its associated equipment shall have a normal operating range of temperatures from 0 to 50 C @ 10% to 95% relative humidity.

The radio shall not interfere with the operation of other electronic products in the field e.g.

- FDM-FM DTL Channel Equipment
- VHF Base/Mobile Stations
- UHF Base/Mobile Stations
- VHF/UHF Hand-held Radios
- FDM-FM Baseband Translation Equipment

It shall meet the requirements as specified in the following documents:

- FCC Part 15 Class A in the 30Mhz 40GHz frequency Band
- EN55022 Class A (8) on conducted emissions
- ETS 300 385 on conducted emissions
- Bellcore GR-1089-CORE on power and signal leads
- EN 50082-1 for RF immunity
- IEC 1000-4-2 for ESD

#### 8.6.7.7 Channel Capacity

The system shall have a capacity to transport 2016 PCM Channels plus 4 – DS1 Wayside channels.

#### 8.6.7.8 Expansion Requirements

The radio's antenna coupling unit shall accommodate the interconnection of additional 6 GHz analog or digital microwave radios to a common waveguide, antenna feeder system.

#### 8.6.7.9 Antenna and Feeder Systems Requirements

- Radios shall be designed to operate without degradation when connected to antenna feeder systems with 23-dB minimum return loss.
- Parabolic dish antennas meeting FCC Antenna Category "A" shall be selected by the Contractor in accordance with the system operating margin characterized by the system design. All antennas furnished shall comply with EIA RS-159B and should be of a high-performance design. All mounting hardware (galvanized steel) shall be furnished and installed.
- All dishes shall be single polarized, low VSWR, standard type antennas such as Andrew HP series, Mark Antennas HP series or an approved equal.
- Each antenna shall be protected with a radome.
- Antennas shall be connected to the equipment with tunable pressurized waveguide. The waveguide shall be of the premium EWPG type with a good return loss. Automatic Dehydrators, low-pressure sensors, distribution manifolds and desiccants shall be furnished and installed in accordance with the cable manufacturer's installation specifications.

#### 8.6.7.10 Radio Transmitter Requirements

 Frequency Stability - Each transmitter shall maintain frequency stability within plus or minus 10 PPM from 0 to +50 degrees Celsius.

- Power Output Depending on design a Monitored Hot Standby Radio shall be capable of a power output of +29 dBm at the antenna port, including branching losses.
- Power Amplifier
  - Each transmitter shall have redundant power amplifiers, if equipped as MHSB. Power amplifiers should be solid state devices; no TWT equipment should be quoted.
  - Failure of a redundant amplifier shall not reduce the power output of the radio. Redundant amplifiers should be independently switched.
  - Replacement of a failed power amplifier shall not require system outage.
- Reverse Path Protection If the BER of both receivers exceeds 10E-5, the radio shall send a control signal through the reverse path to cause the far end to switch to the standby transmitter, or reverse the loop.
- Standby Configuration Radios (configured for hot standby, space diversity) shall be configurable for split transmitter operation with on-line and standby transmitters connected to separate antenna feeder systems.
- Adaptive Transmit Power Control (ATPC) Each terminal shall be equipped with ATPC capability in order to facilitate frequency coordination in congested environments. The ATPC shall constantly monitor the receive level of the signal and provide continuous adjustment of the transmit signal. The algorithm shall trigger the transmitter as required in response to a high level increase in thermal noise due to fade activity or interference. The ATPC algorithm shall trigger the transmit signal up or down in increments up the maximum or minimum output level. The ATPC shall have the ability to be enabled or disabled at the Coalition's discretion or as the need arises.

# 8.6.7.11 Radio Receiver Requirements

 Noise Figure - Receiver Noise Figure at the LNC input shall meet, or exceed 2 dB.

- Unfaded BER Unfaded BER shall not exceed 10E-13.
- Sensitivity Receiver threshold at the branching circulator port, shall not exceed the following.

Radio Configuration	BER 10E-3	BER 10E-6	
Unprotected 6GHz	-71.0 dBm	-68.5 dBm	
MHSB 6 GHz	-68.5 dBm	-66.5 dBm	

#### T/I Ratios

- Co-Channel: For interference originating from sources on the same frequency, whether like signal or FM/FDM, the receiver shall require a maximum of 34 dB greater desired signal than interfering signal in order to maintain a BER of 10E-5.
- Adjacent Channel: For interference originating from sources on adjacent channels (i.e., +/- 30 MHz), the receiver shall require a maximum T/I ratio of 0 dB for like signal and -28 dB for FM/FDM, in order to maintain a BER of 10E-5.
- Dynamic Range Minimum 61 dB (10E-6 BER)
- Low Noise Amplifier For MHSB Rx operation separate redundant low noise amplifiers shall be provided. Replacement of a failed low noise amplifier shall not require system outage.
- Switching Receiver switching shall be hitless and errorless.
- Equalization Each radio shall be equipped, as standard equipment, with a digital transversal equalizer for aligning information packets to compensate for the effects of dispersive fading, and to provide automatic alignment of the equipment. Each radio shall be equipped with an IF adaptive slope equalizer if required, to compensate for IF passband slope, to provide an additional dispersive fading countermeasure.
- Dispersive Fade Margin Dispersive Fade Margin shall be at a minimum 47 dB at a 10E-3BER.
- Space Diversity Combining In a space diversity configuration, the receiver shall be designed so as to ensure that the signal with

the better performance is on line at any given moment. The receiver shall utilize a combining mechanism that dynamically aligns and combines both of the incoming signals in phase. The combined signals from the main and diverse antennas shall be presented to the receiver and the loss of one signal shall not induce errors. The Respondent shall describe, in detail, how this will be accomplished.

- Forward Error Control (FEC) Each radio terminal shall be equipped with FEC with a BER of 10E-13 per hop or better.
- Differential Absolute Delay Equalizer (DADE) The radio shall have a built-in electronic delay equalization mechanism with integrated switch. Equalization should be performed by aligning and combining the signals in phase for presentation to the receiver from space diversity antennas.

#### 8.6.8 Protection Switching Requirements

#### 8.6.8.1 Reframe Time and Frame-Loss Seconds

A frame-loss second shall be defined as a one second interval within which an out-of-frame condition exists or when the BER is 10E-3, or more. The average recovery time of the radio from an out-of-frame and out-of-synchronization condition to the reframed and resynchronized condition shall be 0.25 seconds or less. No more than 5% of the recovery time shall exceed 0.5 seconds. The maximum recovery time shall not exceed 2 seconds.

#### 8.6.8.2 Protection and Recovery

The radio equipment shall consist of one-for-one (1+1) protected hardware, depending on inter-site design, for the following: (RF, IF, and OC-3 levels), hot standby, space diversity, or non-diverse rings or loops. Each transmitter/ receiver shall be equipped with it's own power supply. The RF portion of the radio shall employ electronic switching for manual transmitter switching times of less than 20 milliseconds. Respondents shall state the maximum manual switching time of the transmit multiplexers. The maximum number of bit errors incurred during switching shall be provided for each case. The maximum time for automatic switching of transmitters shall be 10 milliseconds.

Radio receivers and baseband receive units shall provide both manual and automatic error-free switching to the protection unit. If Proposers cannot provide an error-free switch, it must so note and state the maximum switching times and number of bit errors incurred during manual and automatic switching to the protection receiver and multiplex units. The mean time delay between the onset of the BER reaching 10E-6 and the completion of the protection switching shall be less than 30 milliseconds for 10 consecutive measurements.

Recovery of the system from a prolonged (greater than 1 minute) RF signal loss shall take place within 5 seconds after a valid signal is restored. The mean restoration time of a valid DS3 output shall take place within 3 milliseconds after the removal of a short transient system disturbance which interrupts only the radio system framing of the level-3 signals without loss of the basic line signals. This average time shall be determined over at least ten consecutive measurements.

Proposers shall provide a detailed summary and theory of operation of the hot standby equipment, Hardware protection schemes, and SONET path protection schemes. All information supplied by Proposers regarding the available protection systems will be reviewed and considered in the evaluation process.

#### 8.6.9 Cross Connect Panel Requirements

DS-X panels shall be provided for monitoring and testing purposes. Panels shall be provided for each type of interface utilized at each site and shall be grouped according to interface type. The panels shall be placed to minimize cable lengths and cable routing requirements.

#### 8.6.10 Physical Requirements

All hardware and equipment including Radio, Orderwire, Alarm and Control, DS-X Panels and Multiplex equipment shall mount in 7', NEBS compliant self-supporting racks. Each rack shall be provided with a copper ground bar.

All equipment shall be of the latest design, of modular construction, and easily accessible for maintenance and/or expansion.

The Proposer shall state the space requirements for all proposed materials.

Alarm displays shall be provided at the Police dispatch supervisors' positions to monitor radio system alarms.

## 8.6.11 Network Management System

Network management displays and access to OAM&P functionality shall be provided at the Network Control Center in Waller Creek and/or the Austin Energy Control Center. The Proposer is required to develop the methods to integrate the network management functions for the SONET inter-site solution, Option 1, with the City's INM management system. This includes all OAM&P functionality. The successful Proposer shall provide all hardware, software and labor.

# 8.6.12 Asynchronous Digital Microwave Backup Requirements

The Proposer shall provide a hardware/software design and implementation plan to allow the existing digital microwave network to be utilized as a "backup" to the primary SONET network.

- The backup solution may utilize any number or combination of resources described in this section.
- It is desired to have a solution to "switch" to the backup network in the event of a catastrophic failure of the primary network.
- The solution shall be initiated by manual means, but it is desired that the "switch" be a combination of hardware and software to minimize downtime and minimize the amount of manual intervention.

# 8.7 Asynchronous Digital Microwave Loop

#### 8.7.1 Introduction

This section describes the minimum requirements for inter-site communication to new sites required to support the proposed Trunked Radio to Towers, Mobile Relay / Base Station Sites, Master Network Control and Dispatch Centers. The requirements are for Asynchronous Digital Microwave extensions and shall not include a requirement for a Backup Inter-site Network. The design of the inter-site network shall meet the following performance objectives of the trunked radio system:

- · Support the trunked radio system being proposed by the Proposer.
- Support growth up to a total of 90 trunked channels/site

- Support up to 10 conventional channels/site
- Support diagnostic and alarm reporting from the various tower sites and communication centers
- Support a new mobile data system with up to 10 data channels per repeater site
- Toll quality voice transmission, as well as the transmission of data at 19.2
   Kbps or higher

New paths required to support the Proposer's Trunked Radio solution shall be designed utilizing the "Inter-Site Strategy, Option 2" as described in Section 8.1.2 of this document. In summary, the City is providing the existing 6 GHz Asynchronous Digital Microwave Network (DMN) as the inter-site network and new tower sites shall be extended from the existing DMN. Extensions are to be 6 GHz digital microwave and designed so as to become part of the existing looped network (not spurs off the existing network). They shall include at a minimum the following:

- Antenna, line and mounting hardware
- Waveguide pressurization and dehydration equipment
- Loop-protected transmitter and receiver with automatic switchover
- · Multiplex and channel interface cards to support the radio system
- · Service channel to provide intercom between sites
- System to report alarms
- Power supply/charger and battery
- Racks and interconnecting cables

#### 8.7.2 Site Requirements

Site requirements shall be designed to comply with Section 7 of this document.

- Power and Grounding Requirements
- Conduits, Duct and Pathway Requirements
- Environmental Requirements
- Antenna Towers and Support Structures

#### 8.7.3 Path Requirements

#### 8.7.3.1 Radio Paths

The Proposer shall be responsible for performing all aspects of the RF design required to support their proposed solution. The includes at a minimum the following:

- Provide Frequency Coordination
- Path and Site surveys to confirm
  - 1. Site coordinates
  - 2. Ground elevations
  - 3. Define tower requirements
  - Calculate path reliability
- Proposers shall also provide the path engineering calculations based on the equipment being supplied. These include but are not limited to:
  - 1. Path fade margins
  - 2. Percent reliability/annual outage
  - 3. Received signal levels
  - 4. Parabolic antenna sizes and installation heights
- Path Clearance to be performed for Austin area
  - 1. K = 2/3 F = 0.3
  - 2. K = 4/3 F = 0.6
  - 3. K = 1 F = 1.0
- FCC Licensing

## 8.7.4 Routing Requirements

The Coalition desires that the Digital Microwave system be designed and supplied by the Successful Contractor in a diverse route, loop configuration, where possible, in order to provide redundancy and backup in the event of a failure. If it is not possible to maintain the diverse route, loop configuration, the Proposer shall propose other methods to provide enhanced path reliability (e.g. space diversity, hardware protection, and hot standby radios).

The Proposer shall determine the configuration in accordance with the sites selected, as required by their solution, to provide the required coverage. Refer to Section 7.2.2 – Available Sites, of this document that present the Coalitions preferred Repeater Site locations.

# 8.7.5 Network Technology Requirements

The equipment supplied shall comply with all Rules, Regulations, and Standards of FCC Part 94. The supplied equipment shall fully comply with the sections applicable to 45 Mb/s digital radios and multiplexers of the following standards at a minimum:

- Bell Communications Research Technical Advisory TA-TSY-000752, Microwave Digital Radio System Criteria, Issue 1, December 1988.
- Bell Communications Research Technical Reference TR-TSY-000499, Transport Systems Generic Requirements, Common Requirements, Issue 2, December 1988.
- Bell Communications Research Technical Reference TR-TSY-000009, Asynchronous Digital Multiplexers, Requirements and Objectives, Issue 1, May 1986.

Proposed equipment specifications should comply with the stated requirements. However, if there is any disparity, the Proposer shall explain how the equipment satisfies the intent of the particular requirement, and how the end objective will be met. In all cases, the City of Austin reserves the right to enforce the stated requirements. In addition, the Proposer may be required to demonstrate compliance with any requirement.

#### 8.7.6 Multiplexer Requirements

At all tower sites, the looped digital microwave in each direction; shall be interfaced to a NORTEL DMT-300 M13 Multiplexer. The quantity and configuration of DMT-300 equipment including interfaces shall be determined by the Proposer's requirements and the Successful Proposer shall provide all of the equipment required.

### 8.7.7 Protection Switch Requirements

At all tower sites, the NORTEL DMT-300 M13 Multiplexer in each direction; shall be interfaced to a Sunrise digital T1 protection switch. The quantity and configuration of Protection switch equipment including interfaces shall be determined by the Proposer's requirements and the Successful Proposer shall provide all of the equipment required. Equipment shall be of the same model and type, of the existing equipment owned by the City.

# 8.7.8 Channel Bank Requirements

At all tower sites, the Sunrise digital T1 protection switch; shall be interfaced to a Premisys Channel Bank. The quantity and configuration of Premisys Channel Bank equipment including interfaces shall be determined by the Proposer's requirements and the Successful Proposer shall provide all of the equipment required. Equipment shall be of the same model and type, of the existing equipment owned by the City.

#### 8.7.9 Remote Terminal Unit Requirements (RTU)

At all tower sites, a Kasten Chase RTU (smaRTU) is utilized for Alarm and Control Telemetry to the Radios, Multiplexers, Tower lights, Environmental sensors and Power plants. The RTU is modular and has a variety of control and monitoring interfaces. The quantity and configuration of the RTU shall be determined by the Proposer's Requirements and the Successful Proposer shall provide all of the equipment required. Equipment shall be of the same model and type, of the existing equipment owned by the City.

#### 8.7.10 Built-In Test Requirements

Each radio assembly shall perform the following functions as a minimum:

- VF loopback, using the drop and insert multiplexer.
- DS1 loopback, local and remote, when equipped with integral multiplexer.
- Local IF loopback, both before and after the Adaptive Slope Equalizer.
- Test points shall be available for measuring AGC and an analog voltage proportional to BER, at the DS3 level.

## 8.7.11 Service Channel Requirements

The service channel shall be digital and provide for a minimum of two voice talking circuits and two RS-232C data circuits. The service channel shall be implemented without external interface equipment.

# 8.7.12 Orderwire Requirements

A VF Service Channel shall be equipped at all stations. The order wire shall be either bit-stuffed or carried on the overhead so as not to use T1 signaling capacity. The service channel shall operate in the broadcast mode from any communication site (no selective signaling).

The orderwire shall include a speaker and handset. If the local repeater station is "on hook," the digital service channel shall not convert the digital signal to analog and back to digital; instead, the digital signal shall be converted to analog for listening and DTMF detection, and also pass digitally through the station.

In the event of a microwave radio failure at any site (in a loop system), the orderwire should continue to function around the microwave loop. A failure of a single site should not interrupt orderwire service between other functioning

sites. A break or malfunction of any site that prevents orderwire communication between any two functioning sites in the loop is not acceptable.

It is recommended that if this functionality cannot be achieved utilizing the service channel of the radio, that the orderwire be routed via DS1 through the use of a channel bank (DS1 Multiplexer card). It is required, in this case, that the DS1 be automatically switched between two non-protected loop radios to provide this level of redundancy.

## 8.7.13 Asynchronous Digital Microwave Radio Requirements

New Asynchronous Digital Microwave\_paths shall be a NORTEL RD-6 or RD-6U Radio. The radio shall be configured in a diverse route, loop protected and/or Hot Standby Radio depending on network design.

The Asynchronous Radio provides RF transmission paths at the Upper and Lower 6 GHz band and general specifications are as follows.

Frequency Band: Upper and Lower 6 GHz

Channel Capacity: 3 – DS3 44.736 Mbps

4-DS1 1.544 Mbps Wayside Channels

Propagation Reliability: 99.9999%, per hop

• System Availability: 99.999%, end-to-end, between any

two locations in the network

## 8.7.13.1 Asynchronous Radio Interface Requirements

- The radio shall provide 1 DS3 (44.736 Mbps) per channel.
- The Proposer shall provide options for interface protection.
- The radio shall provide 4 DS1 (1.544 Mbps) serial interfaces for the wayside channels.

# 8.7.14 Local And Remote Monitoring And Configuration

 Display/Keypad - Each radio assembly shall be equipped with an integral alphanumeric display/keypad to provide both local and remote equipment status and control of each site in the system independently of any alarm reporting system.

- Panel Display The microwave radio shall be supplied with a front panel mounted meter for use by maintenance personnel. The following metering functions are required at a minimum:
  - 1. Transmitter Output Power, local and remote
  - 2. Received Signal Level, local and remote
  - 3. Bit Error Ratio, local and remote
  - Transmitter AGC voltage
  - 5. Receiver AGC voltage
  - 6. Power Supply voltage
- Failures Each multiplex and modem plug-in unit shall be equipped with a red LED to indicate when that unit should be replaced.
- External Alarms Alarm inputs to be monitored on the SCADA Terminals. Mod/Tx A, Mod/Tx B, Demod/RXU A, Demod/RXU B, Mux Tx A, Mux Tx B, Mux Rx A, Mux Rx B, APC on/off, APC on/off, Pwr Amp on/off, Pwr Amp on/off, Radio Minor, Radio Major, BER A, BER B, RFU PSU Alarm, SP PSU Alarm, TXU Alarm, RXU Alarm, Modulator Alarm, Demodulator alarm, ATDE Alarm, Mux Alarm, Alarm, SCU Alarm, OWU Alarm, WTU Alarm, ACU Alarm, Summary Alarm A, Summary Alarm B, SCE Fail.
- External Controls Shall provide control outputs to be controlled by the SCADA Terminals. Mod/TXU A switch, Mod/TXU B Switch, RXU/Demod A switch, RXU/Demod B switch, Mux/Tx A switch, Mux/Tx B switch, Mux/Rx A switch, Mux/Rx B switch, APC on/off switch, APC on/off switch, Pwr Amp on/off switch, Pwr Amp on/off switch, DS1 Loopback, DS1 Loopback, DS1 Loopback, DS1 Loopback.
- Serial Port The radio assembly shall be equipped with an RS-232C port to extend the Control and Alarm system to a network management software system.
- Remote Management KASTEN CHASE Applied Research provides a management application and system, Communications Alarm Systems Control (CASC), to monitor the existing DMN. The radio shall be supplied with hardware and software to provide functionality equivalent to the existing DMN.

# 8.7.15 Power Requirements

The Radio shall operate with input power of either +/- 24 Vdc, -48 Vdc depending on unit option and power plant design.

The Radio shelf shall include a Power Distribution Panel with breakers, alarm lights, and power distribution connections for the radio equipment shelves and interfaces.

#### 8.7.16 Environmental Requirements

The Radio and its associated equipment shall have a normal operating range of temperatures from 0 to 55 C @ 10% to 95% relative humidity.

Shielding and filtering shall be provided to prevent interference from or to, other radio frequency equipment installed near or in the vicinity of the proposed equipment. The equipment shall meet or exceed spurious frequency emissions, conducted or radiated, as outlined in Part 15 of the FCC Rules and Regulations, Subpart J, Class B Computing Devices. Equipment shall be operationally compatible with the following types of equipment located adjacent to the microwave radio e.g.

- FDM-FM DTL Channel Equipment
- VHF Base/Mobile Stations
- UHF Base/Mobile Stations
- VHF/UHF Hand-held Radios
- FDM-FM Baseband Translation Equipment

## 8.7.17 Channel Capacity Requirements

- The system shall have a capacity of 672 PCM channels per radio channel.
- The system shall have a total capacity of 2016 PCM Channels.
- The system shall provide 4 DS1 Wayside channels.

#### 8.7.18 Expansion Requirements

The radio's antenna coupling unit shall accommodate the interconnection of additional 6 GHz analog or digital microwave radios to a common waveguide, antenna feeder system.

## 8.7.19 Antenna and Feeder Systems Requirements

 Radios shall be designed to operate without degradation when connected to antenna feeder systems with 23-dB minimum return loss.

- Parabolic dish antennas meeting FCC Antenna Category "A" shall be selected by the Contractor in accordance with the system operating margin characterized by the system design. All antennas furnished shall comply with EIA RS-159B and should be of a high-performance design. All mounting hardware (galvanized steel) shall be furnished and installed.
- All dishes shall be single polarized, low VSWR, standard type antennas such as Andrew HP series, Mark Antennas HP series or an approved equal.
- Each antenna shall be protected with a radome.
- Antennas shall be connected to the equipment with tuneable pressurized waveguide. The waveguide shall be of the premium EWPG type with a good return loss. Automatic Dehydrators, low-pressure sensors, distribution manifolds and desiccants shall be furnished and installed in accordance with the cable manufacturer's installation specifications.

#### 8.7.20 Radio Transmitter Requirements

- Frequency Stability Each transmitter shall maintain frequency stability within plus or minus PPM from 0 to +50 degrees Celsius.
- Power Output Depending on design a Monitored Hot Standby Radio shall be capable of a power output of +29 dBm at the antenna port, including branching losses.

#### Power Amplifier

- Each transmitter shall have redundant power amplifiers, if equipped as MHSB. Power amplifiers should be solid state devices; no TWT equipment should be quoted.
- Failure of a redundant amplifier shall not reduce the power output of the radio. Redundant amplifiers should be independently switched.
- Replacement of a failed power amplifier shall not require system outage.
- Reverse Path Protection If the BER of both receivers exceeds 10E-5, the radio shall send a control signal through the reverse path to cause the far end to switch to the standby transmitter, or reverse the loop.

- Standby Configuration Radios (configured for hot standby, space diversity) shall be configurable for split transmitter operation with online and standby transmitters connected to separate antenna feeder systems.
- Automatic Transmit Power Control (ATPC): Each terminal shall be
  equipped with ATPC capability in order to facilitate frequency
  coordination in congested environments. The ATPC shall be triggered to
  high power state in response to a high level increase in thermal noise due
  to fade activity or interference. The ATPC shall have the ability to be
  enabled or disabled at the Coalition's discretion or as the need arises.

#### 8.7.21 Radio Receiver Requirements

- Noise Figure Receiver Noise Figure at the LNC input shall meet, or exceed 2 dB.
- Unfaded BER Unfaded BER shall not exceed 10E-13.
- Sensitivity Receiver threshold at the branching circulator port, shall not exceed the following.

Radio Configuration	BER 10E-3	BER 10E-6
Unprotected 6GHz	-75.0 dBm	-73.5 dBm
MHSB 6 GHz	-73.5 dBm	-71.5 dBm

#### T/I Ratios

- Co-Channel: For interference originating from sources on the same frequency, whether like signal or FM/FDM, the receiver shall require a maximum of 34 dB greater desired signal than interfering signal in order to maintain a BER of 10E-5.
- Adjacent Channel: For interference originating from sources on adjacent channels (i.e., +/- 10 MHz), the receiver shall require a maximum T/I ratio of 0 dB for like signal and -28 dB for FM/FDM, in order to maintain a BER of 10E-5.
- Dynamic Range Minimum 61 dB (10E-6 BER)

- Low Noise Amplifier For MHSB Rx operation separate redundant low noise amplifiers shall be provided. Replacement of a failed low noise amplifier shall not require system outage.
- · Switching Receiver switching, shall be hitless and errorless.
- Equalization Each radio shall be equipped, as standard equipment, with
  a digital transversal equalizer for aligning information packets to
  compensate for the effects of dispersive fading, and to provide automatic
  alignment of the equipment. Each radio shall be equipped with an IF
  adaptive slope equalizer if required, to compensate for IF passband slope,
  to provide an additional dispersive fading countermeasure.
- Dispersive Fade Margin Proposers shall be responsible for providing path engineering on a path-by-path basis, which shows the sum of the fade margin and the antenna discrimination will be better than 50 dB for paths with the potential for long delay interference.
- Space Diversity Switching The receiver shall be designed so as to
  ensure that the receiver with the better performance is on line at any given
  moment. The receiver shall monitor the incoming RF/IF signal for signal
  degradation, and initiate a receiver switch before errors occur. The
  transfer to the alternate receiver shall be without errors. The Proposers
  shall describe, in detail, how this will be accomplished.
- Forward Error Control (FEC) Each radio terminal shall be equipped with FEC.
- Differential Absolute Delay Equalizer (DADE) An adjustment shall be available to equalize different waveguide lengths for Space Diversity antennas.

## 8.7.22 Protection Requirements

#### 8.7.22.1 Reframe Time and Frame-Loss Seconds

A frame-loss second shall be defined as a one second interval within which an out-of-frame condition exists or when the BER is 10E-3, or more. The average recovery time of the radio from an out-of-frame and out-of-synchronization condition to the reframed and resynchronized condition shall be 0.25 seconds or less. No more than 5% of the recovery time shall exceed 0.5

seconds. The maximum recovery time shall not exceed 2 seconds.

## 8.7.22.2 Protection and Recovery

The radio equipment shall consist of one-for-one protected (at RF, IF, and DS3 levels), hot standby, space diversity, or Non-Protected, loop systems. Each transmitter / receiver shall be equipped with it's own power supply. The RF portion of the radio shall employ electronic switching for manual transmitter switching times of less than 20 milliseconds. The Proposer shall state the maximum manual switching time of the transmit multiplexers. The maximum number of bit errors incurred during switching shall be provided for each case. The maximum time for automatic switching of transmitters shall be 10 milliseconds.

Radio receivers and baseband receive units shall provide both manual and automatic error-free switching to the protection unit. If Proposers cannot provide an error-free switch, it must so note and state the maximum switching times and number of bit errors incurred during manual and automatic switching to the protection receiver and multiplex units. The mean time delay between the onset of the BER reaching 10E-6 and the completion of the protection switching shall be less than 25 milliseconds for 10 consecutive measurements.

Recovery of the system from a prolonged (greater than 1 minute) RF signal loss shall take place within 5 seconds after a valid signal is restored. The mean restoration time of a valid DS3 output shall take place within 3 milliseconds after the removal of a short transient system disturbance which interrupts only the radio system framing of the level-3 signals without loss of the basic line signals. This average time shall be determined over at least ten consecutive measurements.

The Proposer shall provide a detailed summary and theory of operation of the hot standby equipment and/or loop switching schemes. All information supplied by Proposers regarding the available protection systems will be reviewed and considered in the evaluation process.

#### 8.7.23 Cross Connect Requirements

DS-X panels shall be provided for monitoring and testing purposes. Panels shall be provided for each type of interface utilized at each site and shall be grouped according to interface type. The panels shall be placed to minimize cable lengths and cable routing requirements.

#### 8.7.24 Physical Requirements

All hardware and equipment including Radio, Orderwire, Alarm and Control, DS-X Panels and Multiplex equipment shall mount in 7', NEBS compliant self-supporting racks. Each rack shall be provided with a copper ground bar.

All equipment shall be of the latest design, of modular construction, and easily accessible for maintenance and/or expansion.

Alarm displays shall be provided at the Police dispatch supervisors' positions to monitor radio system alarms.

The Proposer shall state the space requirements for all proposed materials.

#### 8.7.25 Network Management Requirements

This microwave network is managed with a PC based network management system that is located at the City's Radio Shop on Smith Road, with a back-up PC-Based manager at the existing APD Communication Center equipment room. The Proposer shall evaluate this system and propose any changes/modifications required meeting the requirements of the proposed solution. If the Coalition decides to extend the digital microwave network, Option 2, the Proposer shall develop and implement the solution on this management system or propose, provide and implement an alternate solution with backup. The Proposer's solutions shall include all hardware and software, required interfacing the existing or alternate management system to the microwave network. If the Proposer provides an alternate solution the Proposer's Proposal shall include training for a minimum of ten City personnel. The training shall include at a minimum installation, operations, maintenance, and administration. The Proposer shall provide all costs associated with the system implementation and training including travel, if off-site training is required.

# 8.8 Acceptance Requirements

The Proposer shall respond describing all testing procedures and methods that will be provided to meet the following criteria. The testing procedures shall include all

Factory, Installation, Power up, and Operational Procedures and Practices. The Coalition shall have the option the witness all testing procedures. All test results, Factory and Field, shall be recorded and shall be a requirement of the As-Build and Documentation Requirements.

#### 8.8.1 Factory Acceptance Testing

Prior to System Acceptance for delivery, all Inter-site equipment shall be factory and field tested. The systems shall be tested in the proposed design configuration, including all Radios, Antennas, Multiplexers, Interfaces, Cables, Protection Switching, and OAM&P Functionality at a minimum. Tests shall be conducted as configured in system at factory for 24-48 hrs at elevated temperatures. All equipment specifications shall be met before approval of the factory test.

In addition to other standard manufacturer's test procedures, the following parameters will be tested at the factory and in the field:

- · Transmitter Frequency
- Transmitter Power
- · Operation of Reverse Path Protection
- Operation of Hardware Protection
- Receiver Sensitivity at 10E-3 and 10E-6 BER
- T/I Ratios
- Errorless Receiver Switching
- Unfaded BER
- Reframe Time and Frame-loss Seconds
- Equipment Alarms

In addition to individual equipment testing, factory acceptance testing shall include simulated system conditions for hop-to-hop and end-to-end BER measurements and availability calculations. All equipment integrated by the Successful Proposer will be included in this procedure.

# 8.8.2 Field Acceptance Testing

Field acceptance shall consist of actual path measurements to ensure compliance with system design requirements.

Measurement of the Inter-site communication system will be made on the basis of complete installation, testing and acceptance of the Inter-site equipment, complete, in place and in full and proper operation for each site.

Measurement of this item shall include all wiring and connections to equipment and all installation, labor, materials, etc. required for completion of all interconnections to other systems to complete the installation of the Inter-site Network.

The successful Proposer shall be required to demonstrate end to end connectivity with the appropriate test methods.

- Bit Error Rate Tests on all Transport interfaces for 24 hours
- Bit Error Rate Tests (BERT) for a period of 2 hours on all Add / Drop interfaces
- Voice Frequency tests on all VF interfaces

Test Result documentation shall be provided in hard and soft copy. Hard copy shall be in 3 ring binders. Soft copy shall be 2 CD-ROM copies.

# 8.9 Documentation Requirements

System maintenance manuals shall be furnished for all aspects of the Inter-site Communications Network. Documentation shall provide instructions for installation and placement into service of the equipment, and to provide information, procedures, and recommendations for maintenance of the equipment.

Each instruction book shall provide descriptive information, alignment procedures, maintenance and troubleshooting procedures and factory test data. The descriptive information section will provide an overall operational outline of the radio and technical specifications. The alignment procedure section will cover installation, tune-up, and start-up tests. The section on maintenance and troubleshooting procedures will contain regular maintenance procedures and equipment troubleshooting.

Factory and Field System Test Results will be included in the section on factory test data.

Installation documentation shall include complete system and site drawings. Drawings shall be AutoCAD R 14 format and shall be provided in hard and soft copy. Soft copy shall be 2 CD-ROM copies.

#### 8.10 Training Requirements

For all communication Hardware and Software for, Option 1 or Option 2, the Proposer's proposal shall include the option of training for a minimum of ten City personnel. The training shall include at a minimum installation, operations, maintenance, and administration. The Proposer shall provide all costs associated with the system implementation and training, including travel if off-site training is required.

#### 8.11 Submittal Requirements

The Proposer shall provide the following "Inter-Site Design" submittals for approval as part of this section. The "Inter-Site Design" shall be prepared as a contiguous document to allow the inter-site requirements to evaluated separately from the Trunked Radio Design. Some components may be requirements in the Inter-site and Trunked Radio proposals (e.g. Antenna Structures, Land, etc). The Proposer shall include only the associated costs for the Inter-site requirements in the Inter-site Design (e.g. new structure needs engineering, construction costs, the Inter-site antenna add an incremental cost for structure loading). The following list describes the requirements for the "Inter-Site Design".

- Design for Option 1 and Option 2 for inter-site communication using the Coalition strategies
- Analysis used in determining the choice between fiber/radio in option1
- Cost proposal for implementing both options to implement inter-site communication
- Proposal for Utilizing the existing Digital Microwave as a backup in Option 1
- Licensing documentation for proposed additional microwave hops
- Statement of acceptance of Coalition SONET networks
- Interface requirements for trunked to inter-site communication
- Interface requirements for network management
- Diagram of site equipment and interconnection cables
- Individual equipment power requirements
- Layout of equipment by rack
- Channel allocation chart
- Path analysis and data sheets
- Path profiles
- Individual equipment specification sheets
- Antenna and antenna line specifications
- Diagram of antenna and line mounting details
- · Details on site alarms
- Network Management Proposal
- Battery and power supply calculation sheet

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#### 9.0 DISPATCH FACILITIES

#### 9.1 Overview

It is the purpose of this section to outline the requirements for the dispatch facilities needed for this project. This section contains an overview of the equipment to be accommodated in the new dispatch centers, and describes the preferred console configuration for each dispatch center. Proposers are to inspect each of the existing and proposed dispatch centers prior to preparing an RFP response. Proposers shall review each of the current dispatch areas to become familiar with existing equipment, and equipment to be controlled by the new consoles. Drawings of the new dispatch centers will be made available for review as addenda to this RFP.

Section 9.2 contains minimum specifications for the furniture to be used to integrate all of the equipment and items described in Section 9.1. <u>Provide two (2) choices of manufacturers' furniture for the Coalition to select from.</u>

Section 9.3 presents an overview of the requirements of the dispatching network. Section 9.4 provides the minimum specifications for the radio dispatch consoles to be placed at the operator positions, while Section 9.5 focuses on the electronics in the console switch.

The remaining sections provide specifications for other ancillary equipment to be included in the dispatch centers, including master time sources, a master logging recorder, a fire station alerting system, and interoperability and patching equipment.

Each of the dispatch facilities shall be linked to the trunked radio system by one of two methods: Desktop RF control stations (local or remoted) or desktop CRT dispatch consoles linked to the infrastructure via fiber or dedicated telco circuits provided by a Coalition member agency.

Agencies installing wireline interfaced CRT dispatch consoles include the following:

- City of Austin Police Department (14)
- City of Austin Fire Department (6)
- City of Austin EMS Department (10)
- City of Austin Aviation Department (3)
- City of Austin Airport Police (3)
- Austin Energy (9)

- City of Austin Health and Human Services (1)
- City of Austin Water and WasteWater (3)
- Travis County Sheriff's Office (8)
- Travis County Department of Transportation and Natural Resources (2)
- Austin Independent School District (2)
- Austin Community College (1)
- Capital Area Planning Council (12)
- Capital Metropolitan Transportation Authority (6)
- City of Pflugerville (2)
- University of Texas (1)
- West Lake Hills Police Department (1)

Agencies requiring new console furniture with their CRT consoles include:

- The City of Austin Police Department
- City of Austin Fire Department
- · City of Austin EMS Department
- Travis County Sheriff's Office
- Travis County Department of Transportation and Natural Resources
- Capital Metropolitan Transportation Authority

Your proposal must include a dispatch center layout for each agency needing new console furniture that will accommodate the items listed in its respective section. You must provide at least one configuration from each of two different furniture vendors of your choosing for each agency. For the agencies listed above, the charts provided in their respective section are for new console furniture and not for interim solutions at existing communication centers.

# 9.1.1 New Regional Communications Center

The agencies listed below are considering the construction of a new Regional Emergency Communications and Transportation Management Center. The location of this facility has not been determined. The Coalition is currently working with a consultant to determine the feasibility and design of such a center. If this facility is constructed, these agencies may move their dispatching functions into the new facility and vacate existing dispatching facilities or may use those

facilities for purposes of backup. In any event, new console furniture will be required for any agency that opts to move to this new facility.

- City of Austin Police Department
- · City of Austin Fire Department
- City of Austin EMS Department
- Travis County Sheriff's Office
- Texas Department of Transportation Freeway Traffic Management
- Capital Metropolitan Transportation Authority Special Transit Services

Proposers should must include a conceptual dispatch center layout for each agency needing new console furniture that will accommodate the items listed in its respective section. You must provide at least one configuration from each of two different furniture vendors of your choosing for each agency. This configuration will show the square footage required for each workstation type.

## 9.1.2 Austin Police Department

#### **Existing Dispatch Center**

The location of the City of Austin Police Department's proposed new dispatch center has not been determined yet, and may not be ready for occupation when the Police Department is ready to cut over to the new trunked radio system. Therefore, your proposal must include an option that will allow the Police Department to install desktop CRT operator positions at the existing dispatch center at 715 E. 8<sup>th</sup> Street for use until the new center is complete. The interim dispatch consoles must allow control of both existing conventional channels as well as the new trunked talkgroups. These consoles will provide all of the features and capabilities required of the consoles that will be placed in the new dispatch center.

Nine 19" desktop CRT consoles will be required for the existing dispatch center.

The console electronics switch for this facility will be located in the radio equipment room on the same floor as the dispatch center. The console electronics switch shall be connected to the system infrastructure via GAATN fiber, using the City's existing 6 GHz digital loop microwave system as a redundant path. The console electronics will include a logging recorder interface to provide 30 talkgroup audio outputs to the PD's logging recorder. The console electronics will also provide an interface to the existing digital instant recall recorders.

PROP	OSED 4			NSOLE LA	T DISPATC	H CENTE	R	
TTEM	Call Taker	Call Taker Training Position	Call Taker Supervisor	Dispatcher Primary	Dispatcher Information	Dispatcher Tactical	Dispatcher Training Position	Dispatche Superviso
QUANTITY	40	4	1	14	2	3	2	1
			CPU	J's				
9-1-1 (TCI)	X	X	X	X	X	X	X	X
Radio			X	X	X	X	X	X
Mapping	X	X	X	X	X	X	X	X
Dictaphone			X					X
Perimeter Technology (9-1-1 MIS)			X					X
CAD	X	X	X	X	X	X	X	X
AVL			X	X	X	X	X	X
Administrative			X			X		X
ProNet Tracking System	-							X
Freeway Traffic Management System (FTMS)	Х		X	X	Х	X		X
HVAC & Energy Management System								X
Building Alarm System (Fire & Access)			X					X
			MONIT	ORS			-	
9-1-1 (TCI) (single 21" monitor)	X	X	X	X	X	Х	X	X
Radio (Single 21" monitor)			X	X	X	X	Х	Х
Mapping (Single 21" monitor)	Х	Х	X	X	X	X	X	Х
Dictaphone (Shared monitor with Administrative)			X					X
Perimeter Technology (Shared Monitor with Administrative)			X					Х
CAD (Single 21" monitor)	X	X						
CAD (Two 21" monitors)			Х	Х	Х	X	X	X
AVL (Single 21" monitor)			X	X	Х	X	X	X
Administrative (Single 21" monitors)	-		X			Х		Х
ProNet Tracking System (Single 21" monitor)								X
Freeway Traffic Management System CCTV (Single monitor)	Х		Х	Х	Х	Х	Х	X
HVAC/Energy Mgt. (Single 21" Monitor)	1							X

ITEM continued	Call T .er	Call er Training	Call Taker	Disp tcher	Dispatch formation	Disp cher Tactical	spatcher raining	D' Supervi
0	40	Position 4	1	14	2	3	Position 2	1
Q	40	4		14	4	3	4	X
Building Alarm System (Sin :le 21" Monitor			X					
Television set to local weather channel	X		X	X	X	X	X	X
			OTHER DI	SPLAYS				
Date/Time Di la	X	X	X	X	X	X	X	X
Emergency ID adio and MDC			X	X	X	X	X	X
Weather	X		X	X	X	X	X	X
			OTH	ER				
Multi-Line Tel phone	X	X	X	X	X	X	X	X
Single Line Telephones Two er console		-	Х					X
iter	X	X	X	X	X	X	X	X
Large-Screen Display Controller			X	X	X	X		X
Cassette Recorder			X			X		X
Kevboard/Mouse	X	X	X	X	X	X	X	X
Foot pedal or radio	122			X	X	X	X	X
Headset/Phone Jacks 2 at each console	X	X	х	X		X	X	X
Speakers for scanned talkgroups or radio channels			Х	X	X		X	х
Intercom	X	-	X	X	X	X	X	X
Camera Co coller with	X		X	X	X	X	X	X
Recall Recorder Logging Recorder	X	X	X	X	X	X	X	X
Backup Radio Controller				X	X	X	X	X
Paging System			X	X	X	X	X	X
raging bysicm			ERGON		2.6	14	**	24
Ad ustable Keyboard holder with height and	X	X	X	X	X	X	X	X
tilt ad ustme Fans (2 per console with user	X	$\bar{\mathbf{x}}$	X	X	X	X	X	X
controls								
Heat Strip (base mounted with user	X	X	X	X	X	X	X	X
controls Indirect Lighting	X	X	X	X	X	X	X	x
with user controls Task light – ad ustable arm,	X	X	x	X	X	X	$\overline{\mathbf{x}}$	X
direct li with dimmer Adjustable work ace	X	x	X	x	X	X	X	X

#### Call Taker Console:

Must have space to support at least four (4) CPUs in an enclosed cabinet with access from the rear. CPU's anticipated are as follows:

- 9-1-1 (TCI Workstation)
- Computer Aided Dispatch
- CAD Mapping (GIS)
- Freeway Traffic Management System Controller

Must have desktop space for at least 4 monitors. However, the 9-1-1 (TCI) and CAD call entry may share the same monitor in final configuration. Monitors anticipated are as follows:

- 9-1-1 (This will be a 21" monitor)
- CAD (This will be a single 21" monitor, unless it is shared with the 9-1-1 monitor)
- Mapping (CAD) (This will be a 21" monitor dedicated to mapping)
- Freeway Traffic Management System (This will be a CCTV monitor rather than a computer monitor)
- Small Television monitor set to local weather channel

Additional equipment at these consoles will include the following:

- Multi-Line telephone
- Date and Time display, synchronized with master clock. This
  display should not only show the date, but also the day of the year.
  (e.g.; 2-3-98 034)
- Weather display attached to weather station at the Communications Center. Should show Temperature, Wind (direction and speed), etc
- Printer
- · Keyboard with mouse and touchpad
- Two (2) headset jacks to facilitate training
- · Intercom with speaker
- Camera controller/selector with joystick for Freeway Traffic Management System
- · Recall recorder

In addition, each console should have the following ergonomic equipment and/or features:

- Must be able to accommodate wheelchairs
- Adjustable work surface that can be adjusted to work in a sitting or standing position
- · Adjustable keyboard holder with height and tilt adjustments
- Fans 2 per console, located at each end of the console

- Heat strip mounted at the base of the console with user controls
- · Indirect lighting with user controls including dimmer
- Direct lighting on an adjustable swing arm with user controls including dimmer

## Call Taker Training Console:

Must have space to support at least three (3) CPU's in an enclosed cabinet with access from the rear. CPU's anticipated are as follows:

- 9-1-1 (TCI Workstation)
- · Computer Aided Dispatch
- CAD Mapping (GIS)

Must have desktop space for at least three (3) monitors. However, the 9-1-1 (TCI) and CAD call entry may share the same monitor in final configuration. Monitors anticipated are as follows:

- 9-1-1 (This will be a 21" monitor)
- CAD (This will be a single 21" monitor, unless it is shared with the 9-1-1 monitor)
- · Mapping (CAD) (This will be a 21" monitor dedicated to mapping)

Additional equipment at these consoles will include the following:

- · Multi-Line telephone
- Date and Time display, synchronized with master clock. This
  display should not only show the date, but also the day of the year.
  (e.g.; 2-3-98 034)
- Printer
- Keyboard with mouse and touchpad
- Two (2) headset jacks to facilitate training
- · Intercom with speaker
- Recall recorder

In addition, each console should have the following ergonomic equipment and/or features:

- Must be able to accommodate wheelchairs
- Adjustable work surface that can be adjusted to work in a sitting or standing position
- · Adjustable keyboard holder with height and tilt adjustments
- Fans 2 per console, located at each end of the console
- Heat strip mounted at the base of the console with user controls
- · Indirect lighting with user controls including dimmer

Direct lighting on an adjustable swing arm with user controls including dimmer

## Call Taker Supervisor Console:

Must have space to support at least eleven (11) CPU's in an enclosed, ventilated cabinet with maintenance access from the rear. CPU's anticipated are as follows:

- 9-1-1 (TCI Workstation)
- Computer Aided Dispatch
- CAD Mapping (GIS)
- · Freeway Traffic Management System Controller
- · Trunked Radio System
- · Dictaphone (Logging Recorder)
- 9-1-1 MIS (Perimeter Technology)
- · Automatic Vehicle Location
- Pro-Net Tracking System
- Building Alarm System (Fire Alarms and Access Control)
- Administrative

Must have desktop space for at least 12 monitors. Some monitors will require a sharing device so that multiple CPU's can share a single monitor. Those that are anticipated to be shared are indicated in the list of anticipated monitors below:

- 9-1-1 (TCI Workstation)
- CAD (two monitors required)
- Mapping (CAD)
- Freeway Traffic Management System (This will be a CCTV monitor rather than a computer monitor)
- Trunked Radio System
- Administrative Monitor (This monitor will require a sharing device and will provide access to the following CPU's)
- Administrative
- Dictaphone System (Logging Recorder)
- 9-1-1 MIS (Perimeter Technology)
- Automatic Vehicle Location
- Pro-Net Tracking System
- Building Alarm System for Fire Alarms and Access Control. (This
  monitor may be shared with the HVAC/Energy Management CPU)
- Weather (This will be TV monitor set to the local weather channel)
   It should have the channel selector disabled or accessible only
   through the back panel so personnel cannot change the channel to
   normal TV programming)

Additional equipment at these consoles will include the following:

- · Multi-Line Telephone
- · Two single line telephones for "hot line" calls
- Date and Time display, synchronized with master clock. This
  display should not only show the date, but also the day of the year.
  (e.g.; 2-3-98 034)
- Weather display attached to weather station at the Communications Center. Should show Temperature, Wind (direction and speed), etc.
- Printer
- Keyboard with mouse and touchpad
- · Two (2) headset jacks to facilitate training
- · Intercom with speaker
- Camera controller/selector with joystick for Freeway Traffic Management System
- Recall recorder
- Emergency ID display (for both Radio and MDC)
- Controller to select what is displayed on large-screen displays which will be incorporated in the new communications center
- Cassette recorder which can be set to record a particular radio talk group or channel during a major incident
- Foot pedal for radio (used by dispatcher to "key" the radio for transmissions)
  - Two speakers to monitor scanned or monitored talk groups or radio frequencies
  - Backup radio controller for use as an emergency radio if the wireline console is disabled or there is a radio system failure
- Paging system, such as Zetron, to allow access to group or individual paging.

In addition, each console should have the following ergonomic equipment and/or features:

- Must be able to accommodate wheelchairs
- Adjustable work surface that can be adjusted to work in a sitting or standing position
- · Adjustable keyboard holder with height and tilt adjustments
- Fans 2 per console, located at each end of the console
- Heat strip mounted at the base of the console with user controls
- · Indirect lighting with user controls including dimmer
- Direct lighting on an adjustable swing arm with user controls including dimmer

## Dispatcher (Primary) Console:

Must have space to support at least six (6) CPU's in an enclosed, ventilated cabinet with maintenance access from the rear. CPU's anticipated are as follows:

- 9-1-1 (TCI Workstation)
- Computer Aided Dispatch
- CAD Mapping (GIS)
- Freeway Traffic Management System Controller
- Trunked Radio System
- · Automatic Vehicle Location

Must have desktop space for at least eight (8) monitors. Some monitors will require a sharing device so that multiple CPU's can share a single monitor. Those that are anticipated to be shared are indicated in the list of anticipated monitors below:

- 9-1-1 (TCI Workstation)
- · CAD (two monitors required)
- Mapping (CAD)
- Freeway Traffic Management System (This will be a CCTV monitor rather than a computer monitor)
- Trunked Radio System
- Automatic Vehicle Location
- Weather (This will be TV monitor set to the local weather channel)
   It should have the channel selector disabled or accessible only
   through the back panel so personnel cannot change the channel to
   normal TV programming)

Additional equipment at these consoles will include the following:

- Multi-Line Telephone
- Date and Time display, synchronized with master clock. This
  display should not only show the date, but also the day of the year.
  (e.g.; 2-3-98 034)
- Weather display attached to weather station at the Communications Center. Should show Temperature, Wind (direction and speed), etc.
- Printer
- Keyboard with mouse and touchpad
- Two (2) headset jacks to facilitate training
- · Intercom with speaker

- Camera controller/selector with joystick for Freeway Traffic Management System
- · Recall recorder
- · Emergency ID display (for both Radio and MDC)
- Controller to select what is displayed on large-screen displays which will be incorporated in the new communications center
- Foot pedal for radio (used by dispatcher to "key" the radio for transmissions)
- Two speakers to monitor scanned or monitored talk groups or radio frequencies
- Backup radio controller for use as an emergency radio if the wireline console is disabled or there is a radio system failure
- Paging system, such as Zetron, to allow access to group or individual paging.

In addition, each console should have the following ergonomic equipment and/or features:

- Must be able to accommodate wheelchairs
- Adjustable work surface that can be adjusted to work in a sitting or standing position
- · Adjustable keyboard holder with height and tilt adjustments
- Fans 2 per console, located at each end of the console
- Heat strip mounted at the base of the console with user controls
- · Indirect lighting with user controls including dimmer
- Direct lighting on an adjustable swing arm with user controls including dimmer

# Dispatcher (Information) Console:

Must have space to support at least six (6) CPU's in an enclosed, ventilated cabinet with maintenance access from the rear. CPU's anticipated are as follows:

- 9-1-1 (TCI Workstation)
- Computer Aided Dispatch
- CAD Mapping (GIS)
- Freeway Traffic Management System Controller
- · Trunked Radio System
- Automatic Vehicle Location

Must have desktop space for at least eight (8) monitors. Some monitors will require a sharing device so that multiple CPU's can share a single

monitor. Those that are anticipated to be shared are indicated in the list of anticipated monitors below:

- 9-1-1 (TCI Workstation)
- CAD (two monitors required)
- Mapping (CAD)
- Freeway Traffic Management System (This will be a CCTV monitor rather than a computer monitor)
- Trunked Radio System
- · Automatic Vehicle Location
- Weather (This will be TV monitor set to the local weather channel)
   It should have the channel selector disabled or accessible only
   through the back panel so personnel cannot change the channel to
   normal TV programming)

Additional equipment at these consoles will include the following:

- Multi-Line Telephone
- Date and Time display, synchronized with master clock. This
  display should not only show the date, but also the day of the year.
  (e.g.; 2-3-98 034)
- Weather display attached to weather station at the Communications Center. Should show Temperature, Wind (direction and speed), etc.
- Printer
- Keyboard with mouse and touchpad
- · Two (2) headset jacks to facilitate training
- · Intercom with speaker
- Camera controller/selector with joystick for Freeway Traffic Management System
- Recall recorder
- Emergency ID display (for both Radio and MDC)
- Controller to select what is displayed on large-screen displays which will be incorporated in the new communications center
- Foot pedal for radio (used by dispatcher to "key" the radio for transmissions)
- Two speakers to monitor scanned or monitored talk groups or radio frequencies
- Backup radio controller for use as an emergency radio if the wireline console is disabled or there is a radio system failure
- Paging system, such as Zetron, to allow access to group or individual paging.

In addition, each console should have the following ergonomic equipment

#### and/or features:

- Must be able to accommodate wheelchairs
- Adjustable work surface that can be adjusted to work in a sitting or standing position
- · Adjustable keyboard holder with height and tilt adjustments
- Fans 2 per console, located at each end of the console
- Heat strip mounted at the base of the console with user controls
- Indirect lighting with user controls including dimmer
- Direct lighting on an adjustable swing arm with user controls including dimmer

## Dispatcher (Tactical) Console:

Must have space to support at least six (7) CPU's in an enclosed, ventilated cabinet with maintenance access from the rear. CPU's anticipated are as follows:

- 9-1-1 (TCI Workstation)
- Computer Aided Dispatch
- CAD Mapping (GIS)
- · Freeway Traffic Management System Controller
- Trunked Radio System
- Automatic Vehicle Location
- Administrative

Must have desktop space for at least nine (9) monitors. Some monitors will require a sharing device so that multiple CPU's can share a single monitor. Those that are anticipated to be shared are indicated in the list of anticipated monitors below:

- 9-1-1 (TCI Workstation)
- CAD (two monitors required)
- Mapping (CAD)
- Freeway Traffic Management System (This will be a CCTV monitor rather than a computer monitor)
- Trunked Radio System
- Automatic Vehicle Location
- Weather (This will be TV monitor set to the local weather channel)
   It should have the channel selector disabled or accessible only
   through the back panel so personnel cannot change the channel to
   normal TV programming)
- Administrative (used to access specialized Incident Management System software)

Additional equipment at these consoles will include the following:

- Multi-Line Telephone
- Date and Time display, synchronized with master clock. This
  display should not only show the date, but also the day of the year.
  (e.g.; 2-3-98 034)
- Weather display attached to weather station at the Communications Center. Should show Temperature, Wind (direction and speed), etc.
- Printer
- Keyboard with mouse and touchpad
- Two (2) headset jacks to facilitate training
- · Intercom with speaker
- Camera controller/selector with joystick for Freeway Traffic Management System
- · Recall recorder
- Emergency ID display (for both Radio and MDC)
- Controller to select what is displayed on large-screen displays which will be incorporated in the new communications center
- Foot pedal for radio (used by dispatcher to "key" the radio for transmissions)
- Two speakers to monitor scanned or monitored talk groups or radio frequencies
- Backup radio controller for use as an emergency radio if the wireline console is disabled or there is a radio system failure
- Paging system, such as Zetron, to allow access to group or individual paging.

In addition, each console should have the following ergonomic equipment and/or features:

- · Must be able to accommodate wheelchairs
- Adjustable work surface that can be adjusted to work in a sitting or standing position
- · Adjustable keyboard holder with height and tilt adjustments
- Fans 2 per console, located at each end of the console
- Heat strip mounted at the base of the console with user controls
- Indirect lighting with user controls including dimmer
- Direct lighting on an adjustable swing arm with user controls including dimmer

# Dispatcher Training Console:

Must have space to support at least six (6) CPU's in an enclosed, ventilated cabinet with maintenance access from the rear. CPU's anticipated are as

#### follows:

- 9-1-1 (TCI Workstation)
- · Computer Aided Dispatch
- CAD Mapping (GIS)
- Freeway Traffic Management System Controller
- Trunked Radio System
- Automatic Vehicle Location

Must have desktop space for at least eight (8) monitors. Some monitors will require a sharing device so that multiple CPU's can share a single monitor. Those that are anticipated to be shared are indicated in the list of anticipated monitors below:

- 9-1-1 (TCI Workstation)
- · CAD (two monitors required)
- Mapping (CAD)
- Freeway Traffic Management System (This will be a CCTV monitor rather than a computer monitor)
- Trunked Radio System
- · Automatic Vehicle Location
- Weather (This will be TV monitor set to the local weather channel)
  It should have the channel selector disabled or accessible only
  through the back panel so personnel cannot change the channel to
  normal TV programming)

Additional equipment at these consoles will include the following:

- Multi-Line Telephone
- Date and Time display, synchronized with master clock. This
  display should not only show the date, but also the day of the year.
  (e.g., 2-3-98 034)
- Weather display attached to weather station at the Communications Center. Should show Temperature, Wind (direction and speed), etc.
- Printer
- · Keyboard with mouse and touchpad
- Two (2) headset jacks to facilitate training
- Intercom with speaker
- Camera controller/selector with joystick for Freeway Traffic Management System
- · Recall recorder
- Emergency ID display (for both Radio and MDC)
- Controller to select what is displayed on large-screen displays which will be incorporated in the new communications center

- Foot pedal for radio (used by dispatcher to "key" the radio for transmissions)
- Two speakers to monitor scanned or monitored talk groups or radio frequencies
- Backup radio controller for use as an emergency radio if the wireline console is disabled or there is a radio system failure
- Paging system, such as Zetron, to allow access to group or individual paging.

In addition, each console should have the following ergonomic equipment and/or features:

- Must be able to accommodate wheelchairs
- Adjustable work surface that can be adjusted to work in a sitting or standing position
- · Adjustable keyboard holder with height and tilt adjustments
- Fans 2 per console, located at each end of the console
- Heat strip mounted at the base of the console with user controls
- Indirect lighting with user controls including dimmer
- Direct lighting on an adjustable swing arm with user controls including dimmer

# Dispatcher (Supervisor) Console:

Must have space to support at least twelve (12) CPU's in an enclosed, ventilated cabinet with maintenance access from the rear. CPU's anticipated are as follows:

- 9-1-1 (TCI Workstation)
- Computer Aided Dispatch
- CAD Mapping (GIS)
- Freeway Traffic Management System Controller
- Trunked Radio System
- Dictaphone (Logging Recorder)
- 9-1-1 MIS (Perimeter Technology)
- Automatic Vehicle Location
- Pro-Net Tracking System
- HVAC & Energy Management System
- Building Alarm System (Fire Alarms and Access Control)
- · Administrative

Must have desktop space for at least 12 monitors. Some monitors will require a sharing device so that multiple CPU's can share a single monitor. Those that are anticipated to be shared are indicated in the list of

#### anticipated monitors below:

- 9-1-1 (TCI Workstation)
- CAD (two monitors required)
- Mapping (CAD)
- Freeway Traffic Management System (This will be a CCTV monitor rather than a computer monitor)
- · Trunked Radio System
- Administrative Monitor (This monitor will require a sharing device and will provide access to the following CPU's)
- Administrative
- Dictaphone System (Logging Recorder)
- 9-1-1 MIS (Perimeter Technology)
- Automatic Vehicle Location
- · Pro-Net Tracking System
  - Building Alarm System for Fire Alarms and Access Control. (This
    monitor may be shared with the HVAC/Energy Management CPU)
- HVAC/Energy Management )This monitor may be shared with the Building Alarm System CPU
- Weather (This will be TV monitor set to the local weather channel)
   It should have the channel selector disabled or accessible only
   through the back panel so personnel cannot change the channel to
   normal TV programming)

# Additional equipment at these consoles will include the following:

- · Multi-Line Telephone
- · Two single line telephones for "hot line" calls
- Date and Time display, synchronized with master clock. This
  display should not only show the date, but also the day of the year.
  (e.g.; 2-3-98 034)
- Weather display attached to weather station at the Communications Center. Should show Temperature, Wind (direction and speed), etc.
- Printer
- Keyboard with mouse and touchpad
- · Two (2) headset jacks to facilitate training
- Intercom with speaker
- Camera controller/selector with joystick for Freeway Traffic Management System
- Recall recorder
- Emergency ID display (for both Radio and MDC)
- Controller to select what is displayed on large-screen displays which will be incorporated in the new communications center

- Cassette recorder which can be set to record a particular radio talk group or channel during a major incident
- Foot pedal for radio (used by dispatcher to "key" the radio for transmissions)
- Two speakers to monitor scanned or monitored talk groups or radio frequencies
- Backup radio controller for use as an emergency radio if the wireline console is disabled or there is a radio system failure
- Paging system, such as Zetron, to allow access to group or individual paging.

In addition, each console should have the following ergonomic equipment and/or features:

- Must be able to accommodate wheelchairs
- Adjustable work surface that can be adjusted to work in a sitting or standing position
- · Adjustable keyboard holder with height and tilt adjustments
- Fans 2 per console, located at each end of the console
- Heat strip mounted at the base of the console with user controls
- Indirect lighting with user controls including dimmer
- Direct lighting on an adjustable swing arm with user controls including dimmer

There will be three backup dispatch locations for the Austin Police Department. Desktop CRT dispatch consoles, connected via GAATN to the central Master Network Controller/Audio Switch, will be placed at these locations, for use during special events or in case of an evacuation of the primary dispatch center.

#### North Substation

The primary backup dispatch center will be at the North Substation, located at 12425 Lamplight Village. Twelve (12) desktop CRT consoles will be placed at this location.

# 9.1.3 Austin Fire Department

The City of Austin Fire Departments' proposed new dispatch center will be in the new consolidated center with the Austin Police and EMS Departments.

They will share the Console Electronics Switch at that facility with the APD and EMS. The Fire Department logging recorder will require a 20 talkgroup recorder interface on this switch.

City of Austin Request for Proposal No. RFP VC98300024 Issued on 6/22/98

The new console furniture positions for the Fire department will consist of six (6) Dispatcher positions and four (4) call taker positions. One of the six (6) dispatcher positions will be designated as a supervisor position.

As stated earlier, your proposal must include a dispatch center layout that will accommodate the items listed on the following pages. You must provide at least one configuration from each of two different furniture vendors of your choosing.

Console furniture requirements for Call Taker and Dispatcher furniture are summarized in the following table, and outlined on the following pages.

TCI Wo tation	x	x	x
Ra o Work on		x	×
Sta. Alertin E mi		x	x
AFD MIS software/hardware	X	x	x
Multi-line Phone E  ui .	x	x	x
In ividual Li :htin	x	x	x
H Stri s	x	x	x
Fans	x	x	x
T.V. S eaker	X	x	x
Headset/Phone Jacks	x	x	X
Ma ed ALI Wor on	x	x	x
Unit Status Di d	x	x	x
Dicta hone Pl ack Device			x
Perimeter Tech. Wor tion			x
Clock	x	X	x
Weather Di d		x	x
School Weather Network		x	x
Ke loard/Mouse		x	x
Foot Pedal		x	x
CAD Wor station		x	X
Emer en ID Di d		x	X

Each dispatcher's furniture position shall accommodate the following items:

- TCI Workstation w/21" monitor.
- Radio Workstation.
- CAD Workstation with multiple monitors. (Up to three (3), 21" monitors, one(1) for mapped ALI).
- Station alerting equipment. (Currently 19" rack mounted Zetron System).
- AFD MIS Workstation w/ 19" monitor.
- Multi-line Phone Equipment.
- Individual lighting, heat strips, fan.
- Individual TV speaker.
- Headset/phone jacks for E911 phone and radio equipment.
- Unit Status Display (21" monitor)

The following additional equipment will <u>also</u> be located at the Supervisor's position:

## All of the above plus:

- Dictaphone playback device w/ 19" monitor.
- Perimeter workstation, (may share monitor with Dictaphone).
- School weather network PC (may share monitor w/Dictaphone).

The following items shall be accommodated by the Fire Call-Taker furniture:

- TCI Workstation w/21" monitor.
- CAD Workstation with multiple monitors. (Up to three (3), 21" monitors, one (1) for mapped ALI).
- AFD MIS Workstation w/ 19" monitor.
- Multi-line Phone Equipment.
- · Individual lighting, heat strips, fan.
- Individual TV speaker.
- Headset/phone jack for E911 equipment.
- Unit Status Display (21" monitor)

## 9.1.4 Austin EMS Department

The City of Austin EMS Departments' proposed new dispatch center will be in the new consolidated center with the Austin Police and Fire Departments.

They will share the Console Electronics Switch at that facility with the APD and AFD. The EMS Department logging recorder will require a 30 talkgroup recorder interface on this switch.

The new console furniture positions for the EMS department will consist of ten (10) Dispatcher positions and two (2) call taker positions. One of the ten (10) dispatcher positions will be designated as a supervisor position, and another will be designated as a manager's position.

As stated earlier, your proposal must include a dispatch center layout that will accommodate the items listed on the following pages. You must provide at least one configuration from each of two different furniture vendors of your choosing.

Console furniture requirements for Call Taker and Dispatcher furniture are

City of Austin Request for Proposal No. RFP VC98300024 Issued on 6/22/98

summarized in the following table, and outlined on the following pages.

As the location and configuration of the new dispatch center have not been determined yet, provisions must be made to allow the EMS Department to operate on the new trunked radio system while the consolidated center is under construction. Therefore, your proposal must include an option to purchase six (6) desktop CRT consoles to be used at the existing dispatch center until the new center is ready for occupation. Provisions must also be made to record the audio from 20 talkgroups at this location.

PROPOSED AUS		OLE LAYOUT		
TTEM	Call Taker Position (2)	Combination Operations/ Tactical (8)	Supervisor Position (1)	Manager's Office Position
	CPU	A CONTRACTOR OF THE PARTY OF TH		
9-1-1 System (TCI)	X	X	X	X
Radio Control Processor		X	X	X
CAD/ MDC	X	X	X	X
Mapped ALI / AVL	X	X	X	X
Administrative PC/ MIS	X	X	X	X
Freeway Traffic Management System (FTMS)	X	X	X	X
Dictaphone Controller			1	X
Perimeter Technology Controller (9-1-1 MIS)				Х
	MONIT	ORS		
9-1-1 (TCI)	X	X	x	х
(single 21" monitor)		-		**
Radio (Single 21" monitor)		Х	X	Х
Mapping/ AVL (Single 21" monitor)	Х	Х	Х	Х
Dictaphone (Shared monitor with Administrative)			х	Х
Perimeter Technology (Shared Monitor with Dictaphone)			Х	X
CAD (Single 21" monitor, 2 <sup>nd</sup> shared with Mapping/AVL?)	Х			
CAD (Possibly Two 21" monitor)		Х	Х	X
Administrative (Single 17"- 21" monitor/ Shared?)	X	Х	X	Х
Freeway Traffic Management System CCTV (Single video monitor)	Х	Х	Х	Х
	OTHER DI	SPLAYS		
Date/Time Display	X	X	X	X
Emergency ID (Radio and MDC)		Х	X	Х
TV Weather displays (wall mounted?) visible from any position in center	Х	Х	х	Х

	11			
Station / Field Alertin Inte ace		X	X	X
Radio Control Stations 2		X	X	X
Al hanumeric Pa 'n S stem	X	X	X	X
Multi-Line Telephone min. 8 lines or outdial, EMOP, etc.	X	X	X	x
Speakers for scanned Talkgroups or radio Channels min. 2		X	x	X
S eakers or TV Weather	X	X	X	X
Radio Instant Recall Unit		X	X	X
Radio Logging Recorder Control Station				X
Cassette la back Recorder			X	X
Printer	X	X	X	X
Ke board/Mouse	X	X	X	X
Keyboard/ Mouse Many-to-one Interface	X	X	x	X
Dictaphone Recorder Playback				X
Device 9-1-1				
Foot edal or radio		X	X	X
Headset/Phone Jacks 2 at each console	X	X	X	x
Intercom	X	X	X	X
TV Weather S eaker	X	X	X	X
Lar e-Screen Dis la Controller	X	X	X	X
Camera Controller with joystick or FTM s stem	X	x	X	X
	Ē			
Adjustable Keyboard Holder with hei tht and Tilt ad ustment	X	x	X	x
Ad ustable Monitor	X	X	X	X
Pla orm with hei ht ad'ustment				
Operator Cooling Fans 2 per console with user controls	X	X	X	X
E ui ment Coolin Fans	X	X	x	X
Individual Heating ase mounted with user controls	х	x	x	x
Indirect Lighting with user controls	x	X	X	X
Task li :htin -	X	X	X	X

(High Intensity, direct lighting with ad ustable arm, user controls includin dimmer Cantilevered work su 'ace

x x x x x

#### General Requirements for All Austin EMS Workstations:

Because of the extremely dynamic nature of the EMS operational system demand, it is the intention of the EMS department to provide workstations that are essentially consistent among all positions. The specific configuration of each workstation will be determined according to current operational requirements, with the intent being to provide as much flexibility as possible in the EMS Emergency Communications Center configuration. The only exceptions to this will be:

- two (2) call-taker positions that will be dedicated to that functionality and not require radio control hardware and software, and
- one (1) Supervisory position and one (1) Managers position that will require some additional functionality as noted.

#### Each EMS workstation shall:

- have a single keyboard and pointing device interface to and between all systems at each position
- · accept either mouse, trackball, touchpad and/or touchscreen
- · accommodate wheelchairs
- have space to accommodate a minimum number of full-sized tower CPU devices, as defined under each category heading, in a temperature controlled cabinet that is accessible for maintenance/ repair without disturbing the operator
- accommodate a minimum number of touchscreen monitors as defined under each category heading, on a platform that can be height adjusted to accommodate either sitting or standing operation by a wide range of staff of widely different heights, and
- have an adjustable (cantilevered) work surface that can be adjusted to work in either a sitting or standing position
- have an adjustable keyboard holder with height and tilt adjustments, including negative tilt

- have air circulation/ cooling Fans 2 per console, located at each end of the console with individual operator controls
- have individual Heater/ warming devices mounted at the base of the console with user controls
- have indirect lighting with user controls including dimmer
- have high Intensity direct task lighting on an adjustable arm with user controls including dimmer
- have a speaker for TV weather audio output
- have an intercom with volume controlled speaker
- have space for a printer
- have a playback recorder
- have a multi-Line telephone
- have two (2) headset jacks to facilitate training
- have a Date and Time display, synchronized with master clock. This
  display should not only show the date, but also the day of the year. (e.g.;
  2-3-98 034)
- have a weather display visible at the workstation, either as a part of each workstation or shared in a manner as to allow easy viewing and reference without distraction from basic duties
- have alpha/numeric paging capability through an administrative PC interface on the "desktop",
- Camera controller/selector with joystick for Freeway Traffic Management System
- Controller to select what is displayed on large-screen displays which will be incorporated in the new communications center

# Call Taker "ONLY" Console Positions (2):

#### CPU Requirements

Workstations must accommodate CPU's anticipated to be as follows:

- 9-1-1 (TCI Workstation)
- Computer Aided Dispatch / Mobile Data Computer System
- AVL/ Mapping (GIS)
  - Based upon the specific requirements and system configuration of the CAD/ MDC/ AVL procurement process the AVL & mapping system could either be placed on a separate CPU or be incorporated into the CAD system CPU.
  - In addition, the CAD/AVL unit and incident mapping system will require interface/ integration with the Enhanced 9-1-1 Mapped ALI (Automatic Location Information) system provided by the 9-1-1 service provider.

- Administrative PC/ MIS system
- Freeway Traffic Management System Controller
  - It is not now known whether this will require a separate CPU or a controller module of some similar size.
  - This controller should be switchable between freeway traffic management monitoring and TV weather broadcast monitoring.

### Monitor Requirements

Workstations must have desktop space for at least 4 monitors. In many cases these monitors may be shared between some systems, and are anticipated to be as follows:

- Display monitor
- (This is be a 21" monitor; However, the 9-1-1 (TCI) and CAD call entry may share the same monitor in final configuration.)
- CAD / MDC
- (This will be a single 21" monitor, unless it can be shared with the 9-1-1 monitor)
- Mapping (CAD/AVL/ Mapped ALI)
- (This will be a 21" monitor dedicated to mapping displays)
- · Administrative / MIS system monitor.
- This may be a shared monitor with other systems.
- Freeway Traffic Management System
  - 1. This will be a smaller CCTV monitor rather than a computer monitor.
  - This monitor may be shared with a video weather broadcast display.
     Weather display attached to weather station at the Communications Center. Should show Temperature, Wind (direction and speed), etc

#### Additional requirements

The additional requirements for a Call-Taker position are completely addressed under the heading of "General Requirements for all Austin EMS Workstations"

# Combination Operations Dispatcher / Tactical Console Positions:

### **CPU Requirements**

Although some displays may be consolidated onto a single CPU device, workstations must accommodate a minimum of 5 CPU's anticipated to be as follows:

- 9-1-1 (TCI Workstation)
- Computer Aided Dispatch / Mobile Data Computer System

- AVL/ Mapping (GIS)
  - Based upon the specific requirements and system configuration of the CAD/ MDC/ AVL procurement process the AVL & mapping system could either be placed on a separate CPU or be incorporated into the CAD system CPU.
  - In addition, the CAD/AVL unit and incident mapping system will require interface/ integration with the Enhanced 9-1-1 Mapped ALI (Automatic Location Information) system provided by the 9-1-1 service provider.
- Trunked Radio System Controller
- Administrative PC/ MIS system
- Freeway Traffic Management System Controller
  - It is not now known whether this will require a separate CPU or a controller module of some similar size.
  - This controller should be switchable between freeway traffic management monitoring and TV weather broadcast monitoring.

### Monitor Requirements

Workstations must have desktop space for at least 4 monitors. Some monitors will require a sharing device so that multiple CPU's can share a single monitor. Although in many cases these systems may share monitors/ displays between some systems, and are anticipated to be as follows:

- 9-1-1
- (This will be a 21" monitor; However, the 9-1-1 (TCI) and CAD call entry may share the same monitor in final configuration.)
- CAD
- (This will be as many as two (2) 21" monitors, even though some aspects
  of the CAD system may be displayed on another monitor such as the 9-1-1
  monitor)
- Mapping (CAD/AVL/ Mapped ALI)
- (This will be a 21" monitor dedicated to mapping displays)
- Trunked Radio System Monitor
- This will be a single 21" touchscreen monitor.
- · Administrative / MIS system monitor.
- This may be a shared monitor with other systems.
- Freeway Traffic Management System
  - 1. This will be a smaller CCTV monitor rather than a computer monitor.
  - This monitor may be shared with a video weather broadcast display.
     Weather display attached to weather station at the Communications Center. Should show Temperature, Wind (direction and speed), etc

### Additional requirements

- · Emergency Identification module & display
- Station alerting/paging interface
- Speakers for "SELECT" and UNSELECT" audio as well as TV weather audio output (minimum 3 speakers)
- · Radio/ position instant recall recorder
- · Foot pedal switch for radio transmit capability
- Two (2) radio Control Stations for use as an emergency radio if the wireline console is disabled or there is a radio system failure
- Paging system, such as ZETRON, to allow access to group or individual paging.

#### Dispatch Supervisor Console:

#### **CPU** Requirements

Although some displays may be consolidated onto a single CPU device, workstations must accommodate a minimum of 6 CPU's anticipated to be as follows:

- 9-1-1 (TCI Workstation)
- Computer Aided Dispatch / Mobile Data Computer System
- AVL/ Mapping (GIS)
  - Based upon the specific requirements and system configuration of the CAD/ MDC/ AVL procurement process the AVL & mapping system could either be placed on a separate CPU or be incorporated into the CAD system CPU.
  - In addition, the CAD/AVL unit and incident mapping system will require interface/ integration with the Enhanced 9-1-1 Mapped ALI (Automatic Location Information) system provided by the 9-1-1 service provider.
- Trunked Radio System Controller
- Administrative PC/ MIS system
- This system must contain additional administrative programs/ applications including alphanumeric paging, FAX modems, database applications and others.
- Freeway Traffic Management System Controller
  - It is not now known whether this will require a separate CPU or a controller module of some similar size.
  - 2. This controller should be switchable between freeway traffic management monitoring and TV weather broadcast monitoring.

# Monitor Requirements

Workstations must have desktop space for at least 6 monitors. Some monitors will require a sharing device so that multiple CPU's can share a single monitor. Although in many cases these systems may share monitors/ displays between some systems, and are anticipated to be as follows:

- 9-1-1
- (This will be a 21" monitor; However, the 9-1-1 (TCI) and CAD call entry may share the same monitor in final configuration.)
- · CAD
- (This will be as many as two (2) 21" monitors, even though some aspects
  of the CAD system may be displayed on another monitor such as the 9-1-1
  monitor)
- Trunked Radio System Monitor
- This will be a single 21" touchscreen monitor.
- Mapping (CAD/AVL/ Mapped ALI)
- (This will be a 21" monitor dedicated to mapping displays)
- Administrative / MIS system monitor.
- This may be a shared monitor with other systems.
- · Dictaphone Status Monitor
- This monitor displays alarms and recorder status information; could be shared with some other system(s), and
- 9-1-1 MIS (Perimeter technologies) system monitor
- This monitor displays the status of the 9-1-1 switch and call taking functions for the entire EMS 9-1-1 Answering Point; could be shared with some other system(s) such as the Dictaphone display, but needs to be visible most of the time.
- Freeway Traffic Management System
  - 1. This will be a smaller CCTV monitor rather than a computer monitor.
  - This monitor may be shared with a video weather broadcast display.
     Weather display attached to weather station at the Communications Center. Should show Temperature, Wind (direction and speed), etc

#### Additional equipment at these consoles will include the following:

- Cassette recorder which can be set to record a particular radio talk group or channel during a major incident
- Foot pedal for radio (used by dispatcher to "key" the radio for transmissions)
- Paging system, such as Zetron, to allow access to group or individual paging.
- Emergency Identification module & display
- Station alerting/ paging interface
- · Speakers for "SELECT" and UNSELECT" audio as well as TV weather

audio output (minimum 3 speakers)

- · Radio/ position instant recall recorder
- Two (2) Backup Radio Controllers for use in an emergency radio if the wireline console is disabled or there is a radio system failure.

## Communications Manager Console:

#### **CPU Requirements**

Although some displays may be consolidated onto a single CPU device, workstations must accommodate a minimum of 8 CPU's anticipated to be as follows:

- 9-1-1 (TCI Workstation)
- · Computer Aided Dispatch / Mobile Data Computer System
- AVL/ Mapping (GIS)
  - Based upon the specific requirements and system configuration of the CAD/ MDC/ AVL procurement process the AVL & mapping system could either be placed on a separate CPU or be incorporated into the CAD system CPU.
  - In addition, the CAD/AVL unit and incident mapping system will require interface/ integration with the Enhanced 9-1-1 Mapped ALI (Automatic Location Information) system provided by the 9-1-1 service provider.
- Trunked Radio System Controller
- · Administrative PC/ MIS system
- This system must contain additional administrative programs/ applications including alphanumeric paging, FAX modems, database applications and others.
- Dictaphone (Logging Recorder)
- 9-1-1 MIS (Perimeter Technology)
- Freeway Traffic Management System Controller
  - It is not now known whether this will require a separate CPU or a controller module of some similar size.
  - This controller should be switchable between freeway traffic management monitoring and TV weather broadcast monitoring.

#### Monitor Requirements

Workstations must have desktop space for at least 4 monitors. Some monitors will require a sharing device so that multiple CPU's can share a single monitor. Although in many cases these systems may share monitors/ displays between some systems, and are anticipated to be as follows:

- 9-1-1
- (This will be a 21" monitor; However, the 9-1-1 (TCI) and CAD call entry may share the same monitor in final configuration.)
- CAD
- (This will be as many as two (2) 21" monitors, even though some aspects
  of the CAD system may be displayed on another monitor such as the 9-1-1
  monitor)
- Mapping (CAD/AVL/ Mapped ALI)
- (This will be a 21" monitor dedicated to mapping displays)
- Trunked Radio System Monitor
- This will be a single 21" touchscreen monitor.
- Administrative / MIS system monitor.
- This may be a shared monitor with other systems.
- Dictaphone Status Monitor
- This monitor displays alarms and recorder status information; could be shared with some other system(s), and
- 9-1-1 MIS (Perimeter technologies) system monitor
- This monitor displays the status of the 9-1-1 switch and call taking functions for the entire EMS 9-1-1 Answering Point; could be shared with some other system(s) such as the Dictaphone display, but needs to be visible most of the time.
- Freeway Traffic Management System
  - 1. This will be a smaller CCTV monitor rather than a computer monitor.
  - This monitor may be shared with a video weather broadcast display.
     Weather display attached to weather station at the Communications Center. Should show Temperature, Wind (direction and speed), etc

### Additional equipment at these consoles will include the following:

- Camera controller/selector with joystick for Freeway Traffic Management System
- Controller to select what is displayed on large-screen displays which will be incorporated in the new communications center
- Cassette recorder which can be set to record a particular radio talk group or channel during a major incident
- Foot pedal for radio (used by dispatcher to "key" the radio for transmissions)
- Two speakers to monitor scanned or monitored talk groups or radio frequencies
- Paging system, such as Zetron, to allow access to group or individual paging.
- Emergency Identification module & display

- Station alerting/ paging interface
- Speakers for "SELECT" and UNSELECT" audio as well as TV weather audio output (minimum 3 speakers)
- · Radio/ position instant recall recorder
- · Radio Logging recorder Control Station
- Foot pedal for radio broadcast control
- Two (2) Backup Radio Controllers for use in an emergency radio if the wireline console is disabled or there is a radio system failure.
- Paging system, such as ZETRON, to allow access to group or individual paging.

As the location and configuration of the new dispatch center have not been determined yet, provisions must be made to allow the EMS Department to operate on the new trunked radio system while the consolidated center is under construction. Therefore, your proposal must include an option to purchase six (6) desktop CRT consoles to be used at the existing dispatch center until the new center is ready for occupation. Provisions must also be made to record the audio from 20 talkgroups at this location.

# 9.1.5 Travis County Sheriff's Office

Travis County Sheriff Office administrators are considering the construction of a new dispatch facility. They may elect to construct a facility of their own, or to colocate at the proposed regional emergency communications and transportation management center with the City of Austin.

In either case, the Sheriff's Office will require its own, independent Console Electronics Switch, along with a 30 channel recorder interface from this switch.

The new console furniture positions for the Sheriff's Office will consist of seven (7) Dispatcher positions and one (1) supervisor position.

As stated earlier, proposers must include a dispatch center layout that will accommodate the items listed on the following pages. You must provide at least one configuration from each of two different furniture vendors of your choosing.

Console furniture requirements for dispatcher furniture are summarized in the following table, and outlined on the following pages.

City of Austin Request for Proposal No. RFP VC98300024 Issued on 6/22/98

The following table summarizes the equipment to be placed at each console position:

21" monitor and CPU for CAD (2 monitors re ruired)	X	x
9-1-1 (TCI Wor. on)	x	x
21" monitor and CPU or other area CAD systems	x	x
DTN W er Station		x
AWACS Computer with monitor		$\mathbf{x}$
CRC Computer with monitor		x
Clean air controller	x	x
Touchscreen C. Dispatch Consoles w/ 21" Monitors	x	x
Emergency ID spl	x	x
Mapped ALI	X	x
9-1-1 MIS (Perimeter Technology)	x	x
Call check recorder and pl ack	x	x
Dictaphone Recorder and Monitor	X	x
In ividual lighting	x	x
Intercom system	x	x
Auto e cle Loc ion	x	х
Multi-line telephone	x	x
Buil g alarm system with monitors for outside video cameras	x	x
Adjustable work s face	x	x
Adjustable keyl and holders	x	x

х	х
х	х
х	x
х	х
x	х
x	х
х	х
х	х
х	х
	X X X X X X X

### Supervisor's Console

- 21" monitor and CPU for CAD (2 monitors required)
- 9-1-1 (TCI Workstation)
- 21" monitor and CPU for other area CAD systems
- DTN Weather Station
- AWACS Computer with monitor
- CRC Computer with monitor
- Clean air controller
- Trunked Radio System capable of monitoring and transmitting on all channels
- Mapped ALI
- 9-1-1 MIS (Perimeter Technology)
- Dictaphone Recorder and Monitor
- Individual lighting
- Intercom system
- Automatic Vehicle Location
- Multi-line telephone
- Emergency ID display
- · Building alarm system with monitors for outside video cameras
- Adjustable work surface
- Adjustable keyboard holders
- Headset/phone jacks (2) per console
- Foot pedal
- Station alerting equipment for Fire calls

- Clock
- Mouse and/or tracking ball
- Heat strips
- Alpha paging system
- CAD Mapping (GIS)
- Printer

#### Dispatcher Positions:

- 21" monitor and CPU for other area CAD systems
- 9-1-1 (TCI Workstation)
- 21" monitor and CPU for CAD (2 required)
- Clean air controller
- · Heat strips
- Trunked Radio System capable of monitoring and transmitting on all channels including volunteer fire departments
- Mapped ALI
- Call check recorder and playback
- Intercom system
- Individual lighting
- Automatic Vehicle Location
- Building alarm system with monitors for outside video cameras
- · Adjustable work surface
- Adjustable keyboard holders
- · Headset/phone jacks (2) per console
- Foot pedal
- · Station alerting equipment for Fire calls
- Clock
- Mouse and/or tracking ball
- CAD Mapping (GIS)
- Alpha paging system
- Multi-line telephone
- Emergency ID display
- Printer

The Sheriff's Department will also use the backup dispatch center at CAPCO as their backup facility.

# 9.1.6 Transportation and Natural Resources

The dispatch point for the Travis County Transportation and Natural Resources

City of Austin Request for Proposal No. RFP VC98300024 Issued on 6/22/98

Department is located in the Executive Office Building, at 411 West 13<sup>th</sup> Street in Austin. This center will be interfaced to the trunked radio system network via GAATN fiber interface.

The new furniture requirements include one (1) call taker, two (2) combined call taker/ dispatchers, and one (1) supervisory console..

GIS Wo lon	x	x	x
Comp. Hardware with GIS Software	x	x	x
Multi- 'ne Phone Equipment	x	X	
We er Displ		X	
C Disp ch Consoles w/ 21" Monitors		X	x
Dual Headset / Phone Jacks	x	x	
Keybo / Mouse	X	x	x
Foot Pedal		x	
In vidual Lighting	x	X	x
Auto e cle or		x	
Unit S Displ		x	x
Station Alerting Equipment		X	
Clock	x	x	X

## 9.1.7 Capital Metropolitan Transportation Authority

The Capital Metropolitan Transportation Authority's dispatch center is located at 2910 East Fifth Street, Austin, Texas.

The console electronics switch for this facility will be located at the Authority and will be connected to the system infrastructure via wire-line interface from the dispatch center into the trunked system backbone controller. The console electronics will include a logging recorder interface to provide 6 talkgroup audio outputs to CMTA's logging recorder. The system will also provide an interface to new digital instant recall recorders which will record a minimum of 20 minutes of the most recent conversations between radio dispatchers and authority vehicles.

The new console furniture positions for CMTA will consist of two (2) Fixed Route radio dispatcher positions and two (2) Special Transit radio dispatcher positions, plus two (2) supervisor positions and two (2) additional positions for the UT Shuttle Service Contractor. The dispatcher positions will be configured to integrate the following equipment:

- Desktop CRT dispatch console with 21" monitor
- · Multi-line phone equipment
- Dual headset jacks for radio equipment
- 17" monitor for unit status display
- Clock
- · Weather display
- Foot pedal
- CAD work station
- Keyboard / mouse
- Emergency ID display
- · Dictaphone / Recall Recorder Playback Device

The separate supervisor positions, (1 for Fixed Route and 1 for Special Transit) will consist of:

- Dictaphone / Recall Recorder Playback Device
- · Multi-line phone equipment
- · Headset / phone jacks
- · Individual lighting, heat strips, fan

New furniture console positions for the authority's U.T. Shuttle Service Contractor will be configured as Fixed Route consoles. The exact location of these

two (2) radio dispatch positions has not yet been determined.

A preliminary layout will be provided as an Addendum to the Exhibits section.

The following table summarizes the equipment to be placed at each console position:

* *		
- 1 - 2 - 4 - 1	N.	
	0.7	10
Deskto C Dis atch Console w/ 21" Monitor	x	
lti- e Phone E ui me	X	X
Headset/Phone Jacks or Radio E ui ment	X	X
17" Monitor or Unit St aus Dis 1	X	
Clock	X	
We her Dis 1	X	
Foot Pedal	X	
CAD Workstation	X	
Ke board/Mouse	X	
Emer enc ID Dis 1	X	
Individual Li in , He Panels, Fan	X	X
Dicta hone / Recall Recorder Pl ack Device	X	X

## 9.1.8 City of Pflugerville Police Department

The City of Pflugerville's new dispatch center will be located at 1601 Pfennig Lane. The City plans to build a new Police Department at this location. Two (2) CRT based dispatch consoles interfaced through GAATN to the trunked radio system will be required, along with 6 talkgroup audio outputs to interface to the City's logging recorder, and an interface to instant recall recorders for each dispatch position.

The City will require two (2) console furniture positions to support radio dispatch, E 9-1-1 call taking, and administrative duties. Both console positions shall be configured to support all functions. Each console position shall be configured to support the following equipment:

X
X
X
X
X
X
X
X
X X
X
X
X
X
X
X
X

The Citizen Patrol radio is an old conventional radio with a local antenna. It

operates on 154,950 MHz.

#### EMERGENCY OPERATIONS CENTER

The Emergency Operations Center is located at 201 West 8<sup>th</sup> Street. This facility is used for primarily coordination of critical incidents for management of special events. It will also act as a backup facility for the Austin Fire Department and Austin EMS Department. Five (5) Desktop CRT's will be required at this location to be used on existing furniture.

### CAPITAL AREA PLANNING COUNCIL

The Capital Area Planning Council is located at 2506 South IH 35, suite 100. A training facility has been constructed at this location and is used primarily for training area personnel in the use of the E9-1-1 equipment. Twelve training positions are located in this facility. Twelve Desktop CRT's will be required at this location, which will also act as a backup facility for Coalition agencies.

## 9.1.9 University of Texas at Austin - Police Department

The Dispatch Center for the University of Texas at Austin Police Department will be located in their current facility on the university campus on Manor Road. They will require two (2) dispatcher consoles and two (2) call-taker consoles.

ITEM	DISPATCHER CONSOLE 2	CALL-TAKER CONSOLE 2
CPU's		
9-1-1 (TCI)	X	X
Radio	X	
Dictaphone	X	X
CAD	X	X
AVL	X	
Building Alarm System	X	X
Fire Alarm System	X	X
MONITORS		
9-1-1 (TCI)	X	X
Radio	X	
Mapping	X	X
CAD	X	X

Fire Alarms	X	X
Security Alarms	X	X
Building Alarms	X	X
Weather Channel	X	
AVL	X	X
OTHER		
Multi-Line Telephone	X	X
TDD Phone		X
Printer	X	. X
Large Screen Controller	X	X
Keyboards/Mouse	X	X
Speakers	X	X
Intercom	X	
Recorder for phone lines	X	X
Backup Radio Controller	X	
ERGONOMICS		
Adjustable Keyboard	X	X
Fans	X	X
Task Light w/ adjustable arm	X	X

Console must have space to support at least six (6) CPU's in an enclosed cabinet with access from the rear. It must also have two (2) headset jacks for training. Emergency ID Display for Radio and MDC. Camera controller with joystick for security cameras. Radio scanner for all public safety in the area. Paging system to allow access to group or individual paging. Must be able to accommodate wheelchairs. Adjustable work surface. Lighting with user controls and direct lighting on an adjustable swing arm with user controls including dimmer. Need to support up to six (6) monitors at each station. Foot pedal for radio and 9-1-1 equipment.

# 9.1.10 Other Agencies

All other agencies purchasing desktop dispatch consoles will be reusing existing furniture or surfaces, or will be building new dispatch positions on their own.

## 9.2 Radio Communications Console Furniture - General Description

#### 9.2.1 Intent

It is the intent of this section to describe the minimum specifications for the console furniture to be used in the dispatch centers described in the previous section. Proposers are to provide suggested console layouts that will make the most effective use of available space, and provide the most user friendly aesthetic work area. Proposers shall set up a sample console position from each manufacturer during oral presentations for the Coalition's inspection.

#### 9.2.2 Modular Construction

To enhance the overall flexibility and allow for ease of future expansion, it is preferred that the system be of total modular design and construction. This requirement applies to the cabinetry, electronics and system software. Due to the limited space available in each of the dispatch areas, Proposers are required to provide the most space-efficient configurations possible.

#### 9.2.3 Console Furniture

The following subsections describe the basic minimum requirements for the dispatch furniture. The purpose of this section is to define a standard for the level of quality in console furniture to be supplied. The proposed positions shall be described as Call-Takers, Dispatchers, and Supervisors. The console furniture shall be approved by each Coalition agency that will be using it.

The Coalition agencies are extremely concerned about the ergonomics of the console furniture. Each proposal shall include a minimum of two high quality choices for console furniture from different manufacturers. Each such offering shall be from a manufacturer with experience in public safety dispatch furniture fabrication and installation. The console furniture shall not be standard sheet metal type construction.

The equipment required at each console position shall be housed in high quality furniture (Watson Basik 5 series with Power Primary or equivalent). Such furniture shall be provided from standard, modular components that allow flexibility in any future re-configuration. A variety of color schemes shall be available; each agency will select colors after contract award. Any console furniture provided shall remain available for a minimum of ten years, to allow future expansion with identical furniture.

The furniture shall be supplied with an electric lift feature, capable of lifting the console, to a dispatcher standing level, allowing access and control of the radio controls and CAD keyboard. Lifting and lowering range shall be 28 inches to 40 inches with a keyboard surface tilt range of +9 degrees to -15 degrees.

Writing surfaces shall be at a height of approximately 30" above the floor. An adjustable height keyboard mount shall be provided for the CAD terminal. In addition, if the CRT console requires use of a keyboard for setup, it shall be provided with a similar adjustable mount.

The furniture enclosures must include E.I.A. standard rack-mounts for all console equipment.

Rack-mounts must have E.I.A. standard 19" mounting capability, must not protrude more than 9" onto the work surface to allow a minimum of 15" writing space, must be 15" on vertical for the lower 10½", 5¼", and 90" on vertical for the top, if required.

The cavity for equipment mount shall be a minimum of 21" deep to allow mounting of electronics from both sides. Proper venting for the electronics must be included. Access to the cavity is desired from top, end, and under writing surface. All electronics must be properly grounded.

## 9.2.3.1 Description

The console furniture shall be of the free standing type. Legs, feet or braces required to support the console that can be adjusted to compensate for a non-level floor, shall be supplied. The furniture shall be modular in design, having the capability to add or reconfigure at a later date. The console system shall be constructed of material that is sufficiently durable to withstand a 24-hour Public Safety use environment.

Panel heights from 30" to 78" shall be available for the end panels and console walls. The console walls shall be utilized to provide sound division between operator positions. Panels should be covered with high-density fireproof sound absorbing subsurface above 30" on the operator side and full height on the outside. Subsurface should be covered with 100% polyester Teflon coated fabric and all fasteners completely concealed. Fabric finish should have an abrasion finish meeting ASTM D-3597 and MVPTS-198 standards. Fabric

flammability requirements should meet ASTM E-84 (Tunnel Test) or Class A or Class 1.

## 9.2.3.2 Ergonomic

The radio console 19" CRT touch screen shall be mounted on the desktop or on a pedestal no more than 5 ½" in height. This desktop mounting shall not interfere with or reduce the writing surface area. The CPU shall be stored in the furniture storage area below the console writing surface. The placement of the CPU unit shall allow unobstructed leg and knee movement in the space below the consoles. The keyboard shall be placed on a tray that can be adjusted for height and tilt. The physical placement and layout of the consoles, controls, illumination and other operational functions shall comply with all American Disabilities Act (ADA) requirements. It is stressed that all controls must be within the operator's reach without the need to roll the operator's chair from its normal position.

The console system must provide keyboard platforms with adjustable height and tilt integrated with CRT platforms, which are adjustable in height and tilt electronically. Keyboard/CRT platform must have ability to move/support minimum 200 lb load and lifting capacity with uneven load distribution. Preferable adjustment capability: 28" to 40" in height and keyboards with 9 degree positive to 15 degree negative tilt. Each console must include a wrist rest that will rest on the keyboard platform, and have an adjustable height pad for the keyboard/wrist area.

Each console should offer, as an option, a footrest on the floor in front of each operator that is adjustable in height and angle. Each position is to be equipped with individual task lighting with long life lamps, variable lighting, and an articulating arm allowing full position adjustment by the operator.

#### 9.2.3.3 Construction

A neat and complete appearance shall be provided. All metal edges shall be smooth and finished, absent of sharp metal burrs. All support posts should be constructed of minimum 14 gauge steel or anodized aluminum and finished in fabric to match acoustical partitions. Leveling guides must be integral to the system. Faceplates/Bezels shall be provided for any rail mounted equipment and around all mounting surfaces. Access to the mounting areas from the bottom, rear, front and

top shall be provided. Cabling shall be accommodated inside the console furniture and the console interior shall be vented to prevent the build up of heat.

A writing surface shall be provided at approximately 30" above the floor for the operators. The writing surface shall extend without breaks for the entire length of the console except for the keyboard areas. The writing surface shall contain an adjustable cutout for each and any of the specified keyboard(s), and the depth of the writing surface shall be a minimum of 30". This platform shall comply with the Americans with Disabilities Act (ADA) requirements to accommodate standard wheelchairs. The minimum width of the keyboard platform should be 30 inches to accommodate a standard keyboard and mouse, trackball, and/or touchpad.

### 9.2.3.4 Drawer Pedestal

Drawer pedestals must be mobile and finished completely on all four sides to allow use outside of the consoles and should have dual-wheel, front locking casters. The color of the pedestals must match the consoles. Pedestals should be covered with a high-pressure laminate with high impact vinyl edge material. Drawer hardware must be full extension, precision ball bearing construction. Pedestal design must accommodate capability to provide a pencil drawer, standard desk drawer and hanging file drawer. It is desirable that file drawers have built-in hanging file capacity.

# 9.2.3.5 E.I.A. Rack Mountings

Any fixed racks should be made of tempered steel or aluminum and grounded using a minimum #6 stranded, insulated copper wire with a screw lug/star washer connection. E.I.A. mounting capacity is based on 19" for racks accessed by dispatchers and any inside cavity racks.

Any Desk Top Rack Mounts (DTRM's) must be available in 51/4", 101/2", 153/4", 21" and 261/4" heights. Inside dimensions of DTRM's are 13" depth and 19" width. Exterior finish on DTRM's must conform to that previously specified for Drawer pedestals and match color scheme of console furniture. DTRM's must be top vented for air circulation.

Desk Top Telephone Mounts should be available to provide a minimum 101/2" high (on angle) by 10" deep X 19" wide with 185/8" footprint

front to back. Top of Rack Mounts and Telephone Mounts will be vented for air circulation.

## 9.2.3.6 CPU & PC Cavity Storage Space

Under work surface storage cavity depths should be minimum 14" and have available shelving for CPU/PC's and wire management systems for access to keyboard platforms. Access to cavities should be through the top, bottom, and front or rear dependant on dispatch center wall location and final furniture configuration in dispatch center. Each cavity should have grommet holes for cable drops and be vented to prevent heat build-up. Cavity access must be via simple "Velcro" type or grommet type removal. It is not desirable for client to require special tools or unique skills to access any CPU or PC equipment stored in cavities. Infrequent access will be required to update software via insertion of 3 1/2" diskettes and/or CD-ROM disks.

#### 9.2.3.7 Electrical Connectors

Each console must be equipped with a minimum of ten (10) 3-prong, grounded duplex outlets in an under shelf, U.L. Listed, CSA Rated, 15 amp, 120 Volt power center. The power center must include a circuit breaker with surge suppression of at least 12,000 amp spikes. The power center must have RFI/EMI noise filtering and be equipped with a twelve foot (12') AC power cord.

A minimum of eight (8) 3-prong, grounded duplex outlets shall be available at desktop level.

### 9.2.3.8 Other Connectors

Knockout panels shall be provided that may accommodate other industry standard communication connectors, such as:

- Twin-ax connectors
- Coaxial cable
- RJ-11- RJ-45- RS-232

# 9.2.3.9 Lighting

The individual console positions shall contain separate adjustable task

lighting for user preference. The lighting shall be adjustable by use of a dimmer control mounted in an easy-to-access location on the console. The Successful Contractor shall supply lighting for each position. The task lighting shall be supplied with an articulating arm capable of 120 degrees of movement and 18 degrees of tilt.

The individual console positions shall contain separate indirect lighting for user preference. The lighting shall be adjustable by use of a dimmer control mounted in an easy-to-access location on the console.

## 9.2.3.10 Auxiliary Equipment

The following items shall be controlled at the Supervisory consoles:

- Room lighting controls
- Electric door control

### 9.2.3.11 Fans

Two fans, without filters, shall be proposed for each of the console positions. These should be adjustable for both direction and speed to provide individualized air flow control by the user

#### 9.2.3.12 Air Filtration

As an option, separate air filtering systems shall be proposed for each of the console positions. The air filtering shall contain an air flow unit with a HEPA filter, two pre-filters, adjustable fan control and mounting hardware.

# 9.2.3.13 Heat Strips

Heat strips shall be provided for each console. These shall be mounted underneath the console at approximately foot level and shall have temperature controls.

#### 9.2.3.14 Chairs

Chairs shall not be provided as part of this Request for Proposals.

#### 9.2.3.15 Other

Proposers shall provide in the proposal response detailed drawings, to scale, of the proposed console layouts, as well as detailed drawings of all operator positions (Call takers, Dispatchers, and Supervisors) with all the controls identified.

## 9.2.3.16 Surge Suppression

Surge suppression (RF and power) shall be provided for all console mounted radios. RF surge suppression devices shall not be located within the console furniture.

## 9.3 Radio Dispatch Console Requirements

#### 9.3.1 Intent.

It is the intent of these sections to describe a state-of-the-art communications console that is "user friendly", and incorporates radio control in a manner that will provide for efficient and simple operation by the dispatchers in any combination of functions available. They set the minimum performance standards for a dispatch system consisting of numerous dispatch consoles and associated hardware, software, equipment enclosures and control electronics. Subsections 9.4 and 9.5 highlight the overall requirements of the new radio dispatch console positions and central electronics to be provided at each of the required locations. This equipment shall provide all of the necessary functions to control and monitor two-way conventional base stations, repeaters, the trunked simulcast radio system and related subsystems. The console system shall be capable of facilitating reasonable future radio system expansion needs in the most efficient and flexible manner possible

Note: The term "channel" is used in this section to refer to talkgroups within the trunked radio system or conventional channels.

# 9.3.2 System Architecture

The system architecture shall consist of two main components: a common, centralized electronics package and operator consoles which share the electronics package. The console electronics shall use a distributed multi-processor concept and shall employ a physical architecture that consists of electronic assemblies housing central processing, operator position, radio equipment or auxiliary function interface modules. All circuitry contained in the radio control, signaling and audio amplification sections of the console shall be solid state and shall be microprocessor controlled.

Each console position shall have its own dedicated microprocessor controller board as shall every radio and control interface in the system. All system audio shall be digitally encoded using time division multiplexing (TDM) and digital signal processing (DSP) techniques. The system shall continuously run digital and audio diagnostics to assure proper performance and shall be capable of automatically taking corrective action to restore proper operation should a failure be detected.

Software used to determine the various functions to be performed by the console shall be field programmable. Firmware or software used to determine the various functions to be performed by the console shall be field programmable by the use of electrically alterable non-volatile technology (EE Proms). Adding/deleting channels, and changing channel names, shall be programmable without replacing UV erasing circuits.

All line interface and console supporting electronic circuit boards shall be installed into standard 19" EIA racks. All circuit cards shall have routine adjustment controls, such as line input and output levels, conveniently accessible for adjustments.

# 9.3.3 Quality

All equipment shall conform to industry standards to be of the highest quality and reliability. All materials shall be new (not refurbished) and shall be the best of their respective kinds, free of corrosion, scratches, indentations or other such defects. The design and construction of the communications console(s) and related equipment shall be performed in a neat and craftsmanlike manner and shall be consistent with professional engineering practices.

#### 9.3.4 Standards

All equipment shall meet or exceed the latest applicable standards of the FCC, EIA, NEC, IEEE and APCO Project 16B. In addition, the equipment shall conform to the requirements of the local telephone company with respect to the audio levels and control voltages applied on telephone company lines. Proposers shall certify that the equipment being offered meets or exceeds all of the specified requirements.

# 9.3.5 State-Of-The-Art Design

The equipment being specified shall reflect the state-of-the-art in console design. The offering shall only include items which are currently in design and production; prototype designs will not be considered.

## 9.3.6 Trunking Compatibility

The console system shall be compatible with the trunked radio system specified, meeting all applicable standards of APCO Project 16B. The console shall directly interface (hard wire/modem) with single and multiple site trunked system controller(s) and shall allow full interoperability between trunked and non-trunked (conventional) channels in the system.

## 9.3.7 Remote Console Interface Capability

If separations in excess of a direct wire line connection are required between the console and electronics, a remote interface adapter shall be provided. The remote adapter shall provide full console control at the remote location including full parallel cross indication with all other consoles, selective intercom, all console audio, supervisory control and system diagnostics. Remoting the console shall not cause any voice/audio quality degradation.

Continuous line diagnostics, unnoticed by the dispatcher, shall be run on all lines to verify line integrity and to compensate for line level variations. Transient suppression shall be provided for all remote interface lines if leased telephone line services are required.

The remote interface adapter shall be capable of operation at 9600 baud or greater. The communications rate shall be recommended by the Successful Contractor based upon the intended use of the remote console and the number of channels to be controlled from the remote site. Vendors shall specify the number of phone lines required for each remote operator position, if proposed.

#### 9.3.8 On-Site Visits

In order to ensure an understanding of the system requirements, a qualified technical representative of the console manufacturer shall conduct an on-site visit of the various dispatch locations prior to the proposal submission. This is to ensure that all required functions will be present and properly configured in the system.

# 9.3.9 Proposal Response

In order to demonstrate a thorough knowledge of the total system and an understanding of the overall requirements, Proposers shall submit a detailed proposal response package. The package shall, as a minimum, include a plan view

of each console (to scale), a detailed drawing of each control panel with all controls identified, an itemized listing of the exact equipment being offered for each console, a complete description of each feature of the system, a manufacturer's data sheet for each major system component and a complete list of options available for the system. The package shall include floor plans drawn to scale, showing the furniture layout within each facility. Proposers shall certify that the equipment list included with the proposal response is complete and suitable for the equipment being offered and is compliant with the intent of the specifications.

## 9.3.10 Console Manufacturing Support and Documentation

The console system shall undergo extensive factory testing prior to shipment. This testing shall encompass all parts of the console equipment at the board level. Computer assisted testing shall be used to assure proper operation of all circuit board components and functions furnished with the console.

## 9.4 CRT Operator Console Positions

The console system shall be designed to enhance the dispatchers' capabilities in performing resource management tasks and to minimize the effort and concentration required for efficient control of the radio system. This shall be accomplished through the use of 21 inch touch screen CRT's for selecting dedicated channel and talkgroup control windows representing all base stations, repeaters, talkgroups, alert paging and auxiliary functions at each console.

To minimize operator confusion and the chance of errors being made, all channels, talkgroups and individual ID's shall be referred to and displayed by actual names and NOT numeric references. Cross-referencing a channel name to a number shall not be acceptable for any dispatch operation.

It is desired that all control functions be organized on the viewing screen in the most efficient and flexible manner possible. The use of printed, paste-on and/or snap-on, mechanically engraved labels is specifically excluded under this specification.

Each function within each channel/talkgroup control representation, and all other functions controlled through the console shall be color-coded. These functions shall not be limited to audio activity indicators, transmit push-to-talks, volume controls, etc. It is desired that only touch screen operations be used to implement all primary dispatch functions.

The supervisory positions shall have the capability of over riding the other radio dispatch positions.

#### 9.4.1 Overview

The following subsections provide a brief description of the dispatch radio control consoles and their requirements.

## 9.4.2 Functionality

## 9.4.2.1 Console Reliability

Due to the critical nature of the communications services provided by this facility, a high degree of reliability of the communications control console is required. The console, to the greatest extent possible, shall:

- Be automatically self-correcting
- Provide continuous and automatic self testing and diagnosis
- Alert the operator and dispatch supervisor in the event of component or sub-system failure
- Allow continued operation in the event of failure of a console sub-system, through isolation of the defective subsystem

A high degree of modularity is required to reduce the number of subsystems affected by a single component failure. Repair of sub-systems without totally disabling the console shall be required, as continued console operation is necessary during repair.

Proposers shall recommend the spare modules and parts needed to promptly restore the console to full service following sub-system failure. The recommended spare modules and parts shall be listed as individual items including model or part number, description and cost. These costs shall be included on the system pricing sheets in Section 17.0.

The console switch assembly shall be interfaced with the system/ network terminal and supply statistics and diagnostics identifying console sub-system failures and for the purpose of making service related inquiries.

## 9.4.2.2 Diagnostic

The system shall be equipped with a number of self diagnostic subsystems that shall continuously monitor and verify the correct operation of each distributed microprocessor, each audio path in the console electronics and between the electronics and each dispatch position as well as the Network Controller.

Diagnostic capability shall be distributed among independent and redundant subsystems and shall not rely on one central diagnostic circuit.

Each message on the console electronics digital data bus shall include a Cyclical Redundancy Check or its functional equivalent. All data messages between the Central Processor and individual dispatch positions shall include checksum security measures.

The console electronics shall periodically run audio diagnostics through each and every transmit and receive audio path in the system. The audio paths shall include the automatic audio level setting circuitry and the line coupling transformers.

Should a fault be detected, the Supervisory console shall be notified via the System Network Managers terminal, fault minimizing routines shall be automatically activated and diagnostic information shall be logged on an associated system printer. Diagnostic messages shall be presented in an easy to read text format which shall enable non technical dispatch personnel to intelligently evaluate the situation and minimize disruption to normal operations. Diagnostic systems that require the dispatcher to cross reference an error code to a fault message shall not be acceptable.

# 9.4.2.3 Power Supply

It is a critical requirement that power loss or surges shall not affect operations. Power loss or surges shall not alter the system software or operating parameters at the radio dispatch positions. External power to the console shall be supplied at a nominal 120 VAC at 60 Hz, single phase.

## 9.4.2.4 CRT Display

A state-of-the-art color non-interlacing 21-inch touch screen CRT display shall be used. The operator shall have the ability and necessary interface/keyboard to change the screen displays.

#### 9.4.2.5 Headset and Jack

Please describe available headsets for use with your console.

Offerors shall indicate if these will support combined radio/telephone operation in the new console system, or shall offer alternative make and model recommendations.

The console shall provide independent level setting for audio input from the headset microphone and the goose neck microphones, such that dispatchers may freely switch operation without affecting dispatch audio quality.

Dual headset jacks shall be provided at each position.

### 9.4.2.6 Footswitch

Each of the consoles shall contain a footswitch. The unit shall have a dual pedal footswitch for PTT and CTCS monitor of the selected channel(s). The footswitch shall be heavy duty, designed for constant use, and shall be designed so as not to skid on a smooth flooring surface. The successful Contractor shall supply and install a switch for each console.

## 9.4.2.7 Grounding

The Successful Contractor will provide a grounding ring in each dispatch center and equipment room, and shall connect all console equipment to this ring using exothermic welding. This grounding ring shall be tied back to any building entry bulkhead and to the building ground at the power service entrance.

# 9.4.2.8 CRT Display Positions

Each of the CRT radio consoles shall provide all controls that apply to

the various channel/talkgroups and auxiliary functions for the console. Each console position shall contain as a minimum:

- Talkgroup/Channel Select Each channel shall be capable
  of independent selection by the dispatcher. The channel
  window shall provide a visual window indication when the
  corresponding channel is selected.
- Select Speaker for audio from selected channels/talkgroups, with volume control.
- Unselect Speaker for audio from unselected channels/ talkgroups, with volume control.
- Transmit Function a color coded transmit function to control the push to talk (PTT) function for the selected transmitter(s) and/or talkgroup(s).
- CTCSS Monitor or Disable Function shall disable the receiver CTCSS decoder of the selected base station(s) for monitoring purposes.
- Clock shall display time in twenty four-hour format and day of the year (HH:MM:SS day); shall derive its source from a Master Time Sync to be provided with the system. (Refer to Section 9.8 for Master Time Sync requirements.)
- VU Meter or Display Shall present a visual indication of transmit audio levels leaving the consoles.
- Keypad or screen representation of a keypad for numeric data entry.
- Microphone panel mounted gooseneck microphone, cardioid pattern type. The microphone shall be resistant to interference, such as transmitting hum from lights, cathode ray tube terminals, or other devices used in the proximity of the console.
- Dual Headset Jack a dual headset jack shall be provided which will allow for use of a headset equipped with RJ-327

type plug with modular adapter. Separate headset volume controls for radio and telephone audio output shall be provided. One telephone style handset shall be provided in each dispatch center for training purposes.

- Intercom intercom between operator positions shall be provided. A visual display shall be provided to identify both the calling and called parties by console name. Multiple simultaneous intercom conversations between individual consoles shall be possible.
- Talkgroup/Channel/Telephone Cross Patch this function shall allow cross patching talkgroups/channels and telephone to permit intercommunications. As participants are added or deleted, there shall be no variation in audio levels or quality. All patch audio shall be digitally processed. The patch shall utilize a single trunked channel when patching more than one talkgroup. The central electronics shall contain a minimum of three (3) telephone patches for three phone line trunks.
- Private Call Selected users and dispatchers shall have the ability to selectively communicate "privately" with another individual on the system regardless of what talkgroup either unit is in. The call shall allow the two users to utilize a singe channel resource to communicate without the participation of other units in their respective talkgroups.
- Call Alert Selected users and dispatchers shall have the ability to selectively alert another individual user on the system regardless of what talkgroup either unit is in. The call shall allow an individual to alert another user with a distinctive tone and their individual ID (on display radios only). The alert shall be accomplished over the signaling (control) channel and should not affect any voice channels on the system.
- ID Display Queuing Queuing of at least five plain English ID's (ID scroll list) on the channel window for standard calls and emergency calls.
- All Receiver Mute Function a function that will mute the

received audio from all unselected channels shall be provided. This condition shall be indicated visually, and be canceled by a time-out timer.

- Simultaneous Select and Instant Transmit Function controls shall be provided that allow the operator to manually select any combination of console controlled base stations for simultaneous transmissions. Three selectable combinations shall be allowed at the discretion of the dispatcher. The combined transmission shall utilize a single trunked channel when involving more than one talkgroup.
- Emergency/Reset consoles shall receive emergency alerts from the trunked radio system regardless of the status of the channel control window. Emergency messages shall be indicated by a flashing ID/alias, an emergency ID character, and an audible alert. Dispatcher acknowledgment of the message shall silence the audible alert and stop the flashing display. Multiple emergency messages shall be queued in the display stack and the emergency ID character shall continue to flash until all messages have been viewed by the dispatcher.
- Main/Standby controllers function to display and/or select main or standby trunked site controllers, if required.
- Alert Tones the console shall be provided with three distinct tones used for alerting purposes over the air. Each alert tone shall be immediately broadcast, when activated, on the selected radio channel. The following selections shall be available as a minimum:

Alert 1:	Steady Alert Tone - shall generate a nominal 1000 Hz steady tone		
Alert 2:	Warbling Tone - shall generate a warbling tone		
Alert 3:	Pulsed Alert Tone - shall initiate an automatic sequence, consisting of a nominal 1000 Hz		

## tone, for a period of two (2) seconds

- Paging Encoders Each console shall include a multiformat paging/ signaling encoder that is accessible through the data entry keypad. The encoder shall be capable of encoding two-tone sequential and DTMF signaling formats.
- Manual Override of Paging Encoder Each console shall be capable of accessing the paging encoder if the CAD system fails.
- Preprogrammed Single Button Function Paging Each console shall be capable of supporting 200 pre-programmed single button paging functions.
- Call Indication a color-coded status call indicator shall be provided for each receiver in a channel control window on the CRT screen.
- Talkgroup/Channel Busy Indicator Consoles shall have channel busy indicators to visually indicate that the channel is in use by another console.
- Individual Volume Adjust shall be provided for each channel on the console. Associated color-coded status indicators shall continuously show whether the channel is in the full or adjustable volume mode. The volume control shall be automatically bypassed when a channel is placed in select status.
- Talkgroup/Channel Cross Patch Shall allow the dispatcher to patch any two or more channels together. Trunked talkgroups shall be combined and utilize a single trunked channel for the patched call. Inbound audio from any member of the patch shall be present in the select speaker if any member of the patch is selected. If the dispatcher transmits on any talkgroup or channel included in a patch, then audio shall be heard by all members of the patch.
- Channel Name designated channel control modules shall

include a minimum of eight character alphanumeric display symbols to identify the channel.

- Talkgroup/Channel Cross Mute Consoles shall include a feature which precludes voice communication from a dispatcher's microphone being repeated over loud speakers at other consoles in the dispatch center.
- Supervisory Control The supervisors' consoles shall provide takeover control to prevent other dispatch consoles from keying repeaters or base stations for each channel supported by parallel consoles. Supervisory consoles shall override transmissions from other consoles and field units.
- Repeat Disable The supervisors' positions shall be equipped with the ability to disable received audio from being repeated, as needed.

#### 9.4.3 CRT Installation

The installation of the CRTs for the radio dispatch consoles shall be mounted in accordance with the specifications outlined in Section 9.0. The cabling shall be installed in a neat manner that is appealing to the users. Cable raceways shall be used where possible.

#### 9.5 Console Electronics

### 9.5.1 Description.

The console electronics shall be housed inside cabinets in the Radio Equipment Rooms. Space for front and rear servicing shall be provided. Proposers shall provide the recommended floor space and the proposed footprint, to scale, for the proposed electronics equipment and associated hardware.

The console electronics shall contain the various microprocessor base station and receiver interfaces, console interfaces, auxiliary function interfaces and other interfaces needed for system operation. The interface controller circuit board cards shall be mounted in card cages. All controller cards shall be of plug-in design and shall be able to be inserted and/or removed from the card cage with power applied and the system on-line.

## 9.5.2 System Interfaces

Each transmit and receive interface card shall incorporate all circuitry required to operate remotely controlled base stations and the trunked repeaters. As a minimum, each interface shall consist of a plug-in circuit card that may contain related circuitry, line driver amplifiers, two wire and four wire receive amplifiers, digital automatic level adjustment circuitry and fault diagnostic circuitry. The module shall be capable of remotely controlling base stations using industry standard tone remote control and DC remote control. The Successful Contractor will provide all equipment necessary to insure proper keying of the trunked radio system, and interoperability radios.

## 9.5.3 Auto Diagnostics/Self Healing and Diagnostic Features

The system shall be equipped with a number of self diagnostic subsystems that shall continuously monitor and verify the correct operation of each distributed microprocessor, each audio path in the console electronics, and between the electronics and each dispatch position as well as the Network Controller.

Diagnostic capability shall be distributed among independent and redundant subsystems and shall not rely on one central diagnostic circuit.

Each message on the console electronics digital data bus shall include a Cyclical Redundancy Check or its functional equivalent. All data messages between the Central Processor and individual dispatch positions shall include checksum security measures.

The console electronics shall periodically run audio diagnostics through each and every transmit and receive audio path in the system. The audio paths shall include the automatic audio level setting circuitry and the line coupling transformers.

Should a fault be detected, the Supervisory consoles at designated agency locations and the terminal at the Information Services Building shall be notified via the System Network Manager's terminal. Fault minimizing routines shall be automatically activated and diagnostic information shall be logged on an associated system printer. Diagnostic messages shall be presented in an easy to read text format that shall enable non-technical dispatch personnel to intelligently evaluate the situation and minimize disruption to normal operations. Diagnostic systems that require the dispatcher to cross- reference an error code to a fault message shall not be acceptable.

A redundant timing source clock board is required which shall automatically switch

upon sensing a failure and send an alarm to the System Manager/ Network Manger terminal.

## 9.5.4 Console Auxiliary I/O Functions

Unless otherwise specified within this document, all external auxiliary input and/or output (logic or relay) functions shall be controlled through an auxiliary interface module. These functions shall be controlled from the console position as required.

## 9.5.5 System Statistics

The System Manager/Network Manager terminal shall provide, at a minimum, the following statistics on console activity by operator demand:

- number of PTT by position, agency ID, unit ID, and/or by talkgroup/channel
- total transmit time by position, agency ID, unit ID, and/or by talkgroup/channel
- total receive time by position, agency ID, unit ID, and/or by talkgroup/channel
- · an average of all of the above
- list the above by hour of the day and day of week

# 9.5.6 Console Electronics Power System

It is a critical requirement that power loss or surges shall not affect operations, alter the system software or affect operating parameters. External power to the console will be a nominal 120 VAC at 60 Hz, single phase.

The power sub-system for this portion of the console equipment shall consist of a hot standby power supply(s). The transition from the primary to the hot standby power supply(s) shall not cause the consoles to lose and/or reset any functional and/or operational capabilities.

Console operators shall be alerted of the transition to the standby power supply(s) and shall also be alerted of the failure of the standby power supply(s) when the primary power supply(s) is in use.

# 9.5.7 Grounding.

A below floor grounding ring will be accessible for grounding connection of the

equipment. Exothermic welding shall be used to connect equipment grounds to this ring.

## 9.5.8 Power Line Surge Protection.

AC line transient and surge protection shall be provided for the Central Electronics equipment and each console in the system. The nominal discharge current rating for each line surge protector shall be spikes of 12,000 amperes or more.

## 9.5.9 Telephone Circuit Protection

Transient and surge protection shall be provided for each telephone circuit in the system. The surge protectors shall be sealed, three-element, gas filled spark gaps, having a nominal discharge current rating of spikes of 12,000 amperes or more.

## 9.6 Digital Logging Recorder Specifications

#### 9.6.1 General

The Coalition desires a highly reliable, state-of-the-art recording system that is capable of recording all trunked radio system traffic. This system would be placed in a central facility, such as the City's Radio Service Center, the system Master Network Control Point, or the new Consolidated Dispatch Center. The ideal system would be capable of recording individual RF channels of the system, including the control channel(s), and allow individual conversations to be reconstructed at a later date. Storage of recorded conversations on a digital media that will allow faster search times and greatly reduced storage space requirements is preferred.

Since this equipment will also record 24 hour emergency dispatch communications, it is critical that the provider have the ability to promptly respond to calls for repairs and, that the provider have locally available qualified technicians with access to a local supply of spare parts. Proposers are required to include adequate information in their response to allow the Coalition to fully judge their local maintenance and repair capabilities.

This specification covers an advanced digital logging recorder system designed to provide recording of at least 100 redundant RF channels, plus time/date data. It is preferred that the recording system proposed be capable of logging all audio traffic on the trunked radio system(s), with the ability to "de-trunk" the recorded audio as

needed for individual conversations at a later time. Otherwise, the central recorder should be capable of recording 300 individual talkgroups at the time of installation.

The logging recorder system shall be capable of logging all sources continuously for up to 72 hours without human intervention. Smart systems capable of recording only when a source is active are preferred.

The equipment furnished under this specification shall be designed for continuous duty operation (i.e. 24 hours per day, 365 days per year). The proposed system shall be equipped with dual playback/ record decks.

- The logging recorder electronics shall be mounted in an attractive, modular constructed, free standing cabinet. An industrial computer grade power supply shall be provided for use with a standard commercial power source.
- All equipment supplied under this specification shall be completely
  operational when installed. After the equipment has been accepted, the
  vendor must provide parts for a period of one year and must replace
  any parts which become broken or defective, except by reason of
  accident, misuse, or any casualty, during such period, at no additional
  cost.
- The vendor must make all necessary adjustments and repairs to this system, not required by reason of accident, misuse, or any casualty, at the vendor's expense for a minimum of one year from date of installation. The logging recorder warranty shall correspond to the radio system and console warranty period.
- Service technicians directly employed by the equipment distributor must be available to respond within two hours in the same day in the event service is required.
- The vendor must guarantee parts support for all items under this specification for a period of not less than ten (10) years.
- The vendor must provide four sets of easy to read comprehensive operation instruction manuals.
- The vendor must provide four sets of comprehensive technical manuals,

complete with all block diagrams, wiring diagrams and parts listings.

- The vendor must provide on-site training and instruction for all operators covering all equipment supplied under this specification.
   This training is to be performed by direct employees of the equipment distributor.
- The vendor must be responsible for installation of all equipment covered by these specifications.
- All equipment in this specification must be delivered and installed within the specified timeline.
- The recorder manufacturer must provide a toll free number for service request 24 hours a day 7 days a week. Additionally, the vendor must offer an optional 24 hour, 7 days a week response for emergency service.
- The vendor shall provide any customer satisfaction guarantee available from the equipment manufacturer.
- The recorder/reproducer shall be approved by the following agencies: UL, CSA, DOC, and FCC Part 15 and 68. The machine will have the appropriate markings on the label.
- The vendor must provide an audited financial statement or other information by which the City may verify the financial viability or the proposers company or organization.
- The vendor must provide service by factory trained service technicians.
   No subcontracted service will be acceptable unless technicians are factory trained.
- The vendor must provide a description of the local service organization who will maintain the recording equipment including, name, address, phone number, number of years in operation and number of years experience working with digital recorders.

## 9.6.2 System

- The system must be expandable up to 500 audio sources.
- The system must be software-based to allow for future enhancements.
- The system must provide a user friendly, PC based, remote control and interface with operational instructions. Vendor to provide PC hardware and software.
- The system should be able to support multiple users through a computer network.
- The system must provide at least five levels of security:
  - Listening: Play recordings from allowed drives and channels.
  - Changer: Activate and deactivate recording on selected drives and eject recording media for selected drives.
  - Monitor: Allows selective monitoring.
  - Full: Allows a user to play recordings, activate recording, and eject recording media from selected drives.
  - Supervisor: Allows a user to have full access as well as access to the configuration application.
- The system must provide user specific access rights down to the channel level.
- The system must allow authorized access of selected recorded audio only to those users allowed access as defined in the system database.
- The system must provide a boot-up system test and on-going selfchecking tests.
- The system shall provide for continuous on line diagnostics and continuous supervision, as well as local and remote off line system control access for advanced programming and/or diagnostics. Access to the built in diagnostics and program control shall be via modem by service center personnel and shall provide failure reports, service history and other diagnostics.

- The system must provide an error log to keep track of alerts, error messages and conditions.
- The system should provide automatic placement of a telephone call to a vendor supplied diagnostic center in the event of a failure or alert. If this optional feature is incorporated into the system, the vendor will initiate a service call to dispatch a service representative. This shall be a user selectable feature (on or off).
- The system must provide various off-line (e.g. CPU, RAM, controller, channel, record, recording media) tests and will continuously monitor itself and initiate an alert in the event of a failure. The alert shall include a relay closure, and an alarm indication in the System Management/Alarm Terminal (Section 6.4.2).
- Date and time entries for each recording session shall be displayed on a per channel basis. Recorder time and date shall be displayed during playback operation. Upon selection of a conversation, playback shall be immediate and automatic with no additional wait time search. Playback of any selected channel(s) or a selected mix of channels may be accomplished for listening and for re-recording while continuing to record on all input channels. The device shall include a search mode that allows the user to input time and will accurately seek the selected time.
- A playback recording unit shall be provided for designated Coalition agencies to record cassette tapes for playback and evidence transfer during court cases or for internal investigations.
- The system must provide simultaneous record and playback from the drives.
- The system must provide buffering of all audio in firmware memory and then write the audio independently to each drive.
- The system must provide orderly shutdown, such that if there is a
  power outage, all of the audio buffered in memory will be recorded to
  the media prior to automatic system shutdown.
- The system must display which channels are active during playback or recording.

- The system must provide real-time channel monitoring.
- The system must provide help screens.
- The system must provide a review capability allowing backup in at least 5 second increments.
- The system must provide the capability of skipping to the next or the previous message for precision search and playback.
- The system must be capable of incremental fast forward and rewind at multiple speeds.
- The system must, at a minimum, provide for the following controls:
  - Ready, record, play, rewind, fast forward, review, previous, next, stop, and eject.
- The system must provide for the naming of channels and search by channel name.
- The system must be capable of recognizing record activation via current sensing, voltage sensing, VOX sensing or switch closure.
- The system must provide a media remaining indicator measuring actual time remaining or actual percent of time remaining on the media.
- The system must provide for an append (restore) function enabling the user to reposition to the end of recording.
- The system must be capable of recognizing the write protect tab on the media, or providing over-record protection, and not going into record if the media is so protected.
- The system must record a minimum of 300 hours on a single media.

# 9.6.3 Digital Recording Module

 Each Digital Recording Module must be capable of recording a minimum of 32 audio inputs.

- The system must be capable of user selectively assigning channels to drives within a Digital Recording Module.
- The system must be capable of selective backup of a specific subset of channels within a specific Digital Recording Module.
- The system must be capable of configuring one drive to backup or record in parallel with another drive within the same Digital Recording Module.
- The system must be capable of performing an automatic drive transfer from one drive to another drive within the same Digital Recording Module, when capacity is reached on the first drive.
- The system must be capable of performing an automatic drive transfer from one drive to another drive within the same Digital Recording Module, if a drive failure is detected.
- Digital Recording Modules with dual drives must be capable of providing for simultaneous control of both drives such that a function can be performed on one drive (e.g. formatting) without affecting the operation of the other drive.
- Each Digital Recording Module should be capable of supporting almost instant playback of recorded voice via either the primary controls or the Supervisor's remote PC control.
- The Digital Recording Module shall recognize/use either a compact digital cassette type media or an optical disk. Vendor must specify record hours per cassette assuming continuous recording and specify cassette types e.g., 4mm DAT Tape, 8mm DAT Tape, VHS Tape or record hours on optical disk.
- Vendor must provide MTBF information on major hardware components, e.g., RAM, hard drive, tape or optical disk drives, CRT displays, etc.

### 9.6.4 Electronics

 The system must provide for an AGC range settable in a minimum of three ranges, plus a setting for no AGC.

- The system must provide for an AGC attack time of less than 48 milliseconds.
- The system must be capable of an AGC recovery of 500 milliseconds or less
- The system will ensure that all recorder inputs shall be at least 20K ohms, with DC blocking up to 400V meeting FCC Part 68 requirements.
- The system will be capable of providing a variable level control for each recording channel to permit operation with nominal audio line levels between -40dBm and +15dBm.
- The system will ensure that the idle channel noise shall be a minimum of 35dBrnc.
- The system will ensure that channel crosstalk isolation shall be equal to or greater than 55dB.
- The system will ensure that frequency response shall be in a usable bandwidth of 300 Hz to 3300 Hz or greater.
- The system will ensure that the universal audio inputs provided shall be settable for either current sensing, voltage sensing, VOX sensing, or switch closure (TTL External Trigger) and be FCC approved for direct connection to the telephone system.
- The system will ensure that VOX threshold will be -41 dBm to -17dBm, adjustable in 3dB increments. VOX holdover time must be adjustable from 1 to 9 seconds.
- Commercial power requirements for the Digital Recording Module must be 90 to 132 VAC (between 47 and 63 HZ).
- Power consumption for the Digital Recording Module should be no more than 400W @ 115V.
- The system must be capable of accepting time clock synchronization from another device in the dispatch center, such as a Spectracom

### "Netclock/2".

#### 9.6.5 Environmental

- The storage temperature must be between -30 degrees centigrade (-22 degrees Fahrenheit) and +60 degrees centigrade (140 degrees Fahrenheit).
- The operating temperature for the system must be between 5 degrees centigrade (40 degrees Fahrenheit) and 45 degrees centigrade (113 degrees Fahrenheit).

#### 9.6.6 Accessories

- A beeping telephone interface must be available for providing channel selectable beep tones.
- A desktop digital cassette re-record unit must be available.
- A storage container must be available for holding up to the maximum number of tape cartridges or optical disks.
- If you are proposing DAT tape, cartridges must be provided. If optical disk, 150 disks must be provided
- If you are proposing DAT tape, 2 head cleaning cartridges must be provided for each recorder provided.

# 9.6.7 Options

 The ability to provide a digital voice announcement ("time stamp") of recording time and date simultaneously with recorded voice in an optional playback unit.

#### 9.6.8 Cost

- Proposers shall quote at least two logging recorders which meet the above specifications, and from which the Coalition may choose.
- Provide installed cost of proposed equipment in Section 17.

 Provide cost for 24 hour, 365 days per year, all parts and labor, maintenance contract for the five (5) year period following expiration of initial one (1) year warranty.

### 9.7 Master Time Source

A time generator shall be provided by the Successful Contractor that references WWVB, or the Global Positioning System (i.e. NetClock/2 by Spectracom) to synchronize all clocks in the system. This unit shall interface to and control the time of the radio consoles, console central electronics, trunking system management terminals, SCADA alarm terminals, logging recorders, instant recall recorders, wall clocks, CAD system and the E911 premise equipment.

Wall clocks shall be provided for each Public Safety dispatch center. Provide as options, types/sizes of available clock displays and installed unit cost.

The PSAP master clock shall be traceable to Coordinated Universal Time (UTC) and have a continuous accuracy of .1 seconds relative to UTC when locked to the UTC time source. In the event the PSAP master clock becomes unlocked from the external UTC source and must "free run", it will not exceed an error accumulation of more than 1 second per day.

The PSAP master clock shall provide ASCII time code via an RS-232 serial interface and IRIG (Inter Range Instrument Group) time code that will be used by the PSAP equipment to synchronize their internal clocks. The master clock must have the capability to automatically adjust the Display, RS-232 and IRIG time codes for Daylight Savings Time. It must have a selectable 12 or 24 hour display of Hours, Minutes, and Seconds. It must include a day of the year indication. It must have a means to indicate its status, locked/unlocked and time synchronized or unsynchronized to the external UTC time source. The master clock shall have alarm dry contact closures that are activated upon loss of power or when the clock has lost time synchronization. Optionally, equipment synchronizing to the ASCII time code data may derive alarm status by monitoring the Time Sync Status character within the data stream. Alarm status shall be displayed on the System Management/Alarm Terminals (Section 6.4.2).

## 9.8 Other Requirements

# 9.8.1 Cabling

The following subsections highlight the cabling requirements for the console and

related equipment. Please utilize the information obtained during the site visits to determine the specific requirements.

## 9.8.1.1 Dispatch Centers

All cabling within the PD dispatch center will be routed under the flooring in cable troughs. All cabling shall be plenum rated.

All cabling between the central electronics, other system components, and the microwave channel banks/control lines shall be connected at a demarcation point consisting of an integrated or pre-wired modular panel (such as ADC Telecommunications, AMP, and Ortronics).

The cabling between modular panels shall utilize flat 8 wire RJ45 cable and connectors. The modular interface panel for a specific piece of equipment shall be mounted on the same equipment rack as the equipment it serves.

Circuit identification shall be provided on the modular panels and the cabling.

The use of any conventional type 66 punch blocks is not acceptable. Extensive use of or long runs of TELCO 25 cabling is not preferred.

All cabling shall be terminated with appropriate connectors for ease of field installation and shall be terminated to the nearest 1 foot length. All cabling used for system interconnect shall be tested during factory staging of the system.

A description and detailed wiring diagram of each modular panel utilized shall be provided as part of the "as-built" drawings.

## 9.9 U.P.S. Operation

To provide continuity of operation in the event of an AC power failure, the console electronics and all dispatch consoles operating off of centralized electronics shall be equipped with an Uninterruptable Power Supply (UPS) which shall sustain full console system operation for a period of not less than 2 hours. This UPS will be dedicated to Dispatch Center operation.

# 9.9.1 General Requirements

The UPS system for the new Dispatch Center will provide 2 hours backup time to

all the equipment in the Dispatch Center and equipment room. Offerors are to itemize, by location, each of the additional loads their equipment shall place on these UPS systems. Offerors are to provide worst case voltage and current requirements for each of the loads and provide heat load calculations in BTU's. Offerors are to quote an option to extend the run-time to 4 hours of backup.

Loads shall include the radio dispatch positions, the central electronics, the microwave radios, the logging recorder, master time clock, etc.

## 9.10 Station and Personnel Alerting System

Several Coalition agencies, including the Austin Fire Department and Austin EMS require the ability to selectively alert fixed facilities and mobile and portable units utilizing both

- 1) their current conventional radio channels 4 and 7 (453,100 and 453,275 MHz) and,
- the new trunked radio system.

These agencies will require the replacement of the RF portion of their current radio alerting equipment with narrow band equipment capable of transmitting and receiving on currently available channels. Alerting utilizing the conventional system will be to fixed locations including all Austin Fire and EMS Stations, and selected facilities.

Alerting to mobile and portable units will utilize an alarm channel (talk group) on the new trunked system. The Austin Fire Department requires that all alerting utilizing channels 4 and 7 on the conventional system, and an alarm channel on the new trunked system, have the ability to be done simultaneously.

The radio console equipment in the Dispatch Center should control both the conventional system and the trunked system. In addition, the radio console equipment in the Dispatch Center will be required to be interfaced to a new CAD system, and to current equipment, including decoders (e.g.: Zetron Model 25).

## 9.10.1 Standard Alert Sequence

Upon assignment to an incident in CAD, the CAD system shall:

- Select the appropriate stations or facilities on the Zetron Model 25 and initiate the alerting process.
- The Zetron Model 25 will select the conventional channel (either 4 or 7) on the radio console and send out the appropriate signal(s). Station control

stations will receive the signal, and where appropriate, send back an "ACK" to the Dispatch Center.

- The CAD system shall simultaneously select the trunked radio "Alarm Channel"
- Mobile and portable radios on the trunked system shall have the "Alarm Channel" programmed as a "Listen Only" with "Priority Scan". If a portable or mobile radio is used at an incident, the scan feature can be disabled

The integration of the systems will be such that the dispatcher shall only have to press one transmit switch to simultaneously alert fixed facilities over the conventional system and mobile and portable units on the trunked radio system.

If all unit(s) assigned to an incident were available on radio at the time of the assignment, the systems shall only activate the "alarm channel".

## 9.10.2 Functional Requirements

Each CRT based dispatch console in the Fire/EMS center must provide for CRT actuation of multiple function signaling, 2-tone encoding, and DTMF signaling, as well as generating 5 distinct audio alert tones to annunciate the type of run being dispatched. At a minimum, the following audio alert tones shall be provided:

- Steady 1000 Hz tone
- Repeating burst tone
- Warble
- Plectron Tone
- Quick Call (Hi-Lo)
- Tone for Future Use

Each Station shall have a dedicated UHF control station, interfaced to the existing decoders and PA system. The alerting control station must possess selectivity, sensitivity and power supply characteristics that will ensure complete system reliability.

Each fixed radio installed in fire stations shall be equipped with a rechargeable power system capable of sustaining full operation for a minimum of 8 hours.

## 9.11 Computer Aided Dispatch (CAD) System Interface

# 9.11.1 Travis County

Travis County has purchased Tiburon 2000 Computer Aided Dispatch System. An interface between the proposed radio system and the Tiburon CAD system will be required. At the minimum, the interface should provide the following information to the CAD system when a unit transmits

- Unit ID
- Alias ID (Name/Unit number/etc.)
- Talkgroup

## 9.11.2 Regional Computer Aided Dispatch (CAD) System

A Request for Proposal (RFP) for a Regional Computer Aided Dispatch System is currently being prepared. The Coalition intends to purchase and install this CAD system as soon as possible. When the Regional CAD System is installed, an interface between the trunked radio system and the CAD system will be required. At the minimum, the interface should provide the following information to the CAD system when a unit transmits:

- Unit ID
- Alias ID (Name/Unit number/etc.)
- Talkgroup

# 9.12 Automatic Vehicle Location (AVL) System

The Coalition intends to implement an Automatic Vehicle Location System within the near future. This system is expected to be GPS based and will provide X,Y coordinate information concerning unit location. Certain events will automatically trigger an update of the unit location. One such event is the activation of an emergency alarm from either a portable or mobile radio. An interface between the AVL system and proposed radio system will be required so that the dispatcher receives the following information upon activation of an emergency alert or other defined radio events:

- Unit ID
- Alias ID (Name/Unit number/etc.)
- Talkgroup
- Location information

# 9.13 Interoperability

As this new system will be a shared Coalition-wide resource, direct unit-to-unit interoperability is a required feature. Special talk paths must be provided so that certain Department users can access these mutual aid service links.

At other times, it is desirable for some Departments, such as Police and Fire, to access existing conventional and trunked radio systems operated by others. The methodology for outside-system access shall be accomplished by dispatcher patch and by a user-initiated, computer-controlled RF/audio link.

The following listing identifies outside agencies with which interoperability is required:

- Williamson County EMS
- Elgin EMS
- Bastrop EMS
- Hays County EMS
- Travis County EMS
- Travis County FireNet
- American Medical Response
- The LCRA

The proposed system shall include all interfaces, control station(s) and antenna systems necessary to successfully provide the interoperability described above.

The computer-controlled links shall become active only when a user has specifically selected any one of the interoperability links listed. These links shall also be available for dispatcher monitoring and/or selection.

Proposers must fully describe the operation of the equipment/system proposed to satisfy each of these interoperability requirements.

# SECTION 10.0

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#### 10.0 RADIO EQUIPMENT SPECIFICATIONS

# 10.1 Technical Specifications - Fixed Equipment

## 10.1.1 General Controller Specifications

- Environmental The central controller, and any auxiliary controllers required at remote base station\receiver sites shall be designed to operate under the following conditions:
  - Temperature: -30 degrees to +60 degrees Celsius
  - Humidity: 90% non-condensing
  - Radio Frequency Fields: Equipment shall be properly shielded to allow proper operation in equipment rooms or buildings occupied by base station transmitters, with associated strong R.F. fields.
- Duty Cycle Equipment proposed by vendors shall be rated for continuous duty.
- Radio Channel/Site Expansion Capabilities The central controller proposed for use in the Coalition's Trunked Radio System shall provide for expansion to 100 radio channel operation at a minimum of 12 sites without major hardware modifications. Modular construction with plug in circuit cards is required.
- Data/Control Interfaces All necessary interfaces with base repeaters, peripheral computer hardware or the microwave system shall be provided by the vendor. Interfaces shall include cabling and modems, all of which shall be identified by the vendor in the functional diagrams of the proposed system.
- Alarms and Diagnostics The central controller and its associated subsystems shall provide alarms for key operational parameters, and shall be displayed on CRT screens at designated locations. The system shall provide for remote access for monitoring, inquiry, display, disablement and diagnostic functions. The system shall also provide for automatic, remote notification of designated personnel for specified alarms or alarm levels.

Other operational features of the trunked controller shall be:

- Continuous Channel Assignment Updating
- Recent User Priority
- Adjustments of System Time-Out Parameters
- System Diagnostics

# 10.1.2 Base3 Station/Mobile Relay, 800/900 MHz

#### · General

The selected vendor shall provide complete diagrams for each site showing site plan, equipment layout, the cable placement, connectors used, grounding location, and lengths of all cable used.

Mobile relay base stations are to be 800 or 900 MHz, continuous duty, transmitter/mobile relay, receiver combinations. All transmitters shall be totally solid state. The base station must be in a floor mounted 19" closed rack type cabinet with a door that shall be security protected with a lock. A key shall be required to operate the door latch. All locks shall be keyed the same with twenty-five (25) keys provided.

Metering shall be provided for the base stations/mobile relay units to monitor all points in the transmitter and receiver circuitry needed to maintain, align and adjust these units.

All equipment, at time of delivery, shall be FCC type accepted for the proposed application, and contractors shall provide the type acceptance numbers in their proposals, if available.

Each transmitter shall be equipped with dual terminated circulators and a single harmonic filter to minimize the effects of transmitter produced intermodulation and harmonic products. The terminated circulator shall have minimum reverse isolation of 65 dB; insertion loss shall not exceed 0.7 dB. The port closest to the antenna shall be equipped with an air cooled load capable of dissipating the entire RF output of the transmitter. In the event a transmitter combining unit is utilized, it shall employ dual terminated circulators with the proper load, and harmonic filter; a second set is not necessary in the transmitter equipment.

It is essential that all equipment including receivers, transmitters, terminated circulators, filters, Watt meters and any other RF carrying assemblies

be supplied with type "N", "HN", "LC", Series "C", BNC, or EIA flange constant impedance connectors. Any other type of connector is not acceptable. No adapter shall be utilized with equipment or assemblies to convert from one type of connector to the specified types. If any connectors other than those listed are used and supplied, it shall be considered serious non-compliance with the Specification and may result in the rejection of a bidder's proposal or, after award, a default in the contract.

The stations' receiver and transmitter units may operate into the same antenna; in any event the receiver and transmitter must be capable of simultaneous operation with the antenna configuration supplied. Also, the units shall be protected from other co-site in-band and out-of-band transmitters and shall permit full duplex continuous operation without degradation at each site in the system, with all co-site transmitting equipment activated.

Although continuous or digitally coded squelch is not specified, the trunked system supplied must transmit a suitable code to quiet the associated receivers so that no noise burst (commonly known as squelch tail) will be detected.

Transmitter final current and voltage metering shall be mounted inside of the mobile relay/base station cabinet.

Additional equipment specifications are found in Tables 12-1 to 12-3.

#### - Antennas and Transmission Lines

<u>Transmission Lines</u> - All fixed station RF transmission line used in conjunction with the system shall be Andrew foam or nitrogen filled, minimum 7/8", Heliax coaxial cable or equivalent, for any cable runs exceeding 10.0' for receive or 6.0' for transmit.

For short runs, i.e., less than 10.0' for receive and 6.0' for transmit, Andrew FSJ4-50B or equivalent cables are authorized.

All connectors used shall be type "N", "HN" Series "C", "LC", BNC, or EIA flange, and must be fully compatible with directly associated equipment or jumpers in the system. Connectors must be of non-ferrous construction. No splices

or adapters shall be used under any circumstance. However, it is permissible to utilize different connectors on opposite ends of a cable to avoid the use of adapters. When transforming from one diameter cable to another, it is acceptable to use flange reducers, so long as the cable V.S.W.R. specification is not changed.

Care must be exercised in the installation of all connectors. A loss in excess of 0.25 dB per connector is not acceptable. In addition, any connectors/connections used outdoors must be protected from corrosion and be fully weatherproof. The use of vinyl tape is not acceptable for any purpose whatsoever, its use shall constitute a default of contract.

Antennas - The mobile relay base station antennas shall be of the type necessary to provide the required coverage as specified herein.

All connectors on all fixed station cables and aerials must be type "N", "HN", "LC", Series "C", BNC, or EIA Flange constant impedance. All exposed antenna hardware, i.e., mounting brackets, must be fabricated from 17-7 PH stainless steel.

The Contractor shall determine the correct transmission line lengths for each site and provide opening in the wall for the entrance of the line. All cables must be secured with stainless steel clamps and hardware and put in troughs; these shall be supplied as part of this procurement. The use of coaxial adapters and/or splices is prohibited.

To ensure that antennas and lines meet specifications after installation, all mobile relay base station antennas and transmission lines shall be sweep tested with a time domain reflectometer. A test sweep shall also be made using a frequency domain reflectometer at the operating frequencies with the antenna attached. A chart recording of TDR measurements shall be made and retained in the Site Log. No V.S.W.R. in excess of 1.2:1 is permitted at any fixed station.

# Transmitter Combiner

The Contractor may employ any type of suitable transmitter combiner that meets or exceeds the following parameters:

General	Expandable transmitter combiner shall be provided which will provide inputs for a maximum of ten transmitters when fully expanded. The selection of the combiners will depend upon the final assignment of frequencies.		
Power Rating	The combiner shall provide sufficient operating margin to allow the input of ten transmitters of the output power selected by the vendor for the trunked system.		

Isolation	Transmitter isolation required as a result of an E.M.C. Study performed by the vendor shall be an integral part of the combiner. Isolators shall be equipped with R.F. terminating loads rated for the full output power of the transmitter.		
Bandwidth	The combiner shall provide for use of any frequencies within the public safety trunked frequency pool.		
Frequency Separation	To be determined by final assignment of frequencies.		
VSWR	1.25:1 or less		
Mechanical	Shall be mounted in a self supporting steel relay rack.		
Insertion Loss	2.5 dB maximum, per channel.		
Transmitter Noise	-75 dB, min. @ 500 kHz.		
IMD and Harmonic Prod- ucts	-80 dB minimum		
Full Performance	-30° to +60° C		

# - Receiver Multicoupler/Pre-Amplifier

The Contractor may employ any type of multicoupler or amplifier which meets or exceeds the following parameters:

General	Use of a tower mounted low noise amplifier with a receimulticoupler is optional at each fixed site.		
Tower M	IOUNTED AMPLIFIER: (OPTIONAL)		
Gain	Minimum 10 dB		
Noise Figure	1.0 dB or better		
Third Order Intercept Point	+37 dBm or better		
Mechanical	Shall be housed in a gasket sealed weather resistant housing designed for mounting to the tower structure with galvanized steel U-bolts. Consideration shall be given to the galvanic effect of this box in interacting with the steel tower structure.		
Power Supply	D.C. power shall be passed to the amplifier via the center conductor of the coaxial transmission line. The A.C. Power Supply shall be 120 Volts, 60 Hertz.		

Lightning & Surge Pro- tection (Rated @ 50,000 amps, 30 strokes)	Protection of the A.C. and D.C. power supplies and R.F. input of the amplifier shall be provided by a combination of gas tubes, Zener diodes and M.O.V.'s, and careful grounding of the enclosure.  Metering of the D.C. power supply shall be provided in the equipment shelter at the base of the tower.		
Metering			
	RECEIVER MULTICOUPLER:		
General	Shall provide for a minimum of ten outputs to receivers.  The R.F. input to the device shall be protected with a gas tube type lightning arrester which will pass the D.C. required to power the tower mounted amplifier.		
Lightning Protection (Rated @ 50,000 amps, 30 strokes)			
Mechanical	Shall be mounted in a relay rack with other equipment at the site, or shall be provided with a steel self supporting relay rack. D.C. metering of the tower mounted amplifier power supply shall be mounted in this panel.		
Preselector	A receiver preselector shall be provided to attenuate out of band signals by at least 40 dB.		

Gain	Gain through the multicoupler system shall be at least unity.		
Noise Figure	2 dB or lower		
1 dB Compression Point	18 dBm minimum		
3rd Order Intercept Point	30 dBm minimum		
Receiver-to- Receiver Isolation	25 dB minimum		
Full Performance	-30° C to +60° C		

# 10.2 User Equipment

#### 10.2.1 Overview

The Coalition's trunked radio system will consist of many subsystems, with field equipment specialized to the particular requirements of the different user agencies. Some agencies will utilize control base stations for some or all of their dispatching activities. Mobile and portable radios will fall into several classes, from those with the most features and flexibility such as alpha-numeric displays, telephone interconnect, public safety speaker/microphone/antenna assemblies, etc. to more standard models.

#### 10.2.2 Mobile Radios

Mobile radios shall be capable of performing all functions and features of the system, including wide area operation capability.

# 10.2.3 Portable (Hand-held) Radios

Portable radios shall be capable of performing all functions and features of the system, including wide area operations capability.

# 10.2.4 Distribution of Mobiles, Portables and Control Stations; by Agency

A description of the mobiles, portables, and control stations and associated accessories required for each agency has been provided in the pricing section.

"Control station" refers to a desk mounted mobile radio or base station. "Remote" refers to a desktop unit (with no RF capability) connected to a control station, with audio and control paths to the control station.

# 10.2.5 Dispatch Console Systems

Dispatch console system requirements are provided in Section 9.0.

# 10.2.6 Fire/EMS Alert Paging System

Refer to Section 9.9 for Fire/EMS alert paging system requirements.

# 10.3 Technical Specifications - User Equipment

#### 10.3.1 Mobile Station, 800 or 900 MHz.

#### General

Mobile radios supplied under this procurement shall be frequency synthesized and furnished to operate on a minimum of 128 frequencies in the 800 or 900 MHz land mobile band. Specific channel assignment will be made by the trunking control system. In the event the system control should fail, an indication will be heard on the unit's speaker and the unit shall be switched to a pre-programmed RF channel to operate in the conventional mode. It is preferred that users have the ability to silence the failure indication tone.

The frequency programming shall be accomplished through the use of EE-PROMs. Radios shall be delivered with all necessary channels already programmed. Detailed operational and technical instructions on programming shall also be supplied. The unit shall be 100% solid-state. The RF output power into 50 Ohms shall be 15 Watts minimum.

All mobile stations shall have an engraved or stamped multi-digit unique serial number applied to each unit. These shall be of such type, and located in such a position that their removal or alteration is as difficult to do and as obvious to spot as economically feasible. It is not the intent of the Coalition in requiring this identification to raise the cost of the units

by any significant percentage. Contractor must be aware of this intent when proposing a suitable method of identification.

Additionally, vendors must provide the Coalition with a paper copy and an electronic copy of a complete listing of all unique serial numbers by agency used for identification, and must also maintain a copy in their data bank for five years.

The mobile station exterior housing shall be made of plated or painted steel or aluminum of sufficient gauge to provide for adequate protection and theft deterrence. Plastic, nylon or any synthetic material may be used for the radio enclosure/housing if its usage is adequately justified and it can meet the required performance specifications.

The interconnecting cable, including + and - DC power, shall be of such construction that frequent exposure to hydraulic fluids and petroleum based oils will cause minimal damage such as cracking or softening of the cable jacket.

A transmitter time-out-timer must be provided to limit key-down time.

All mobile units except dash mounted radios shall be supplied with control unit, speaker, microphone and all accessories required for installation. Vendors shall include the price of one control unit for each rear- (trunk-) mounted radio, with the exception of mobiles which require dual control heads, microphones, and speakers.

All mobile units supplied must be fully compatible with the fixed station equipment provided under this procurement.

The contractor shall be required to demonstrate that the microprocessor based equipment is totally functional in the environment which the Coalition intends it to be used. This test shall include, but not be limited to, RF immunity, DC input voltage fluctuations, noise introduced in the DC line and typical usage impact. Any degradation of functional parameters of the equipment supplied due to normal or emergency operation of the vehicle in which it is installed shall be corrected by the Contractor.

All open air mobile units and all external headsets, microphones and speakers must be weatherproofed and suitable for outdoor mounting. All installation cabling, brackets, etc. must be part of this procurement.

Control head mounting locations shall be subject to the approval of the particular agency being supplied. Mobile antennas and cabling to trunk or dash mounted units must be supplied as part of this procurement, replacing any existing cabling and antennas.

Fire, EMS, and special purpose vehicles with intercoms shall be equipped with a water resistant speaker and noise canceling microphone. In addition, when required, pump control units with headsets and water resistant speakers shall be supplied. Mobiles for the Austin Fire Departments must be connected to the Dave Clark intercom system currently in place on fire apparatus.

External heat radiators shall be used to keep the RF power transistors within conservative operating temperature, without allowing airborne contaminants to enter the interior portion of the radio. The housing shall be devoid of any louvers or other openings thereby protecting the radio set from dirt, dust, moisture and splashing water.

The mobile radio shall be capable of operation from a nominal 12 volt do primary power source, with positive action reverse polarity protection to avoid damage if the radio were to be incorrectly installed. In that event, the only damage allowed shall be blown fuses if the radio were turned "ON". The radio set shall operate from a negative ground primary source and shall be wired to the "cold" side of the vehicle ignition switch.

It is anticipated that all power should be derived directly from a 12VDC vehicle battery, without using active components such as transistors in an oscillator circuit, step-up transformers, or rectifiers. Primary power input shall be adequately fused to assure fast and positive action. Proposers should recognize that Fire and EMS vehicles have special power configurations which may require a different power configuration for mobile radios.

Some mobile radios will require priority scanning capability. These units shall be capable of scanning a minimum of ten (10) fleets/subfleets. The operator shall be readily able to select the fleets/subfleets to be scanned, to designate and change the priority channel, and to enable or disable the scanning mode.

 Additional equipment specifications are listed below and also in Tables 10-1 to 10-6. <u>Automatic Unit Identification</u> - Shall transmit a digital unit identification on push to talk.

System Compatibility - Mobile radios shall be equipped and compatible with software related features of the trunking system:

- Dynamic talkgroup reconfiguration
- System access priority
- Central controller failure operating mode
- Signaling error correction (To correct erroneous fleet or subfleet assignments, software shall provide for the mobile to revert to the signaling channel in the event that a unit is assigned to an incorrect fleet or subfleet.)
- Wide area operation capability
- Selective inhibit and uninhibit
- Visual and audible notification whenever any reduced backbone functionality occurs or operation is localized to autonomous subsystems
- Multikey Encryption (Public Safety radios)

Emergency Alarm Switch - As outlined in the pricing section, mobile radio control heads shall be equipped with an emergency switch which will encode a unit identification and emergency status message when depressed. This indication shall be placed onto the system immediately, and shall be decoded and displayed at the user's dispatch center.

<u>Status Tones</u> - Audible indication shall be provided for the following operational conditions:

- System busy
- Callback when channel is available
- Central controller failure
- Time out timer operation
- Access to system denied
- Out of range of trunked system

#### Control

 Mounting - Shall provide for mounting on vertical or horizontal plane mounting surface

- Displays Shall be clearly labeled and shall be backlit for nighttime visibility
- Microphone Palm type, with push to talk switch
- Selector Switches Rotary selectors and volume controls are required, instead of rocker buttons
- Multiple control heads Some vehicles require a front and rear control head (examples: Medic units, Battalion Chief Cars)
- An "on-off" switch shall control primary power to the radio set.
- A volume control shall regulate the audio level of the speaker.
- Indicator lamps (either incandescent, LED, or LCD devices) shall be provided which indicate "radio set on" and "transmitter carrier on" functions.
- A fleet and/or subfleet selector switch or switches, if applicable.

<u>Service Facilities</u> - A central metering jack shall be provided for connecting test apparatus to the radio for measuring transmitter and receiver circuitry alignment.

## Selective Signaling and Alert Decoder

- Shall allow for selective signaling of mobile units
- Shall provide a visual or audible indication on the control head of a call waiting

<u>Talk-around and Conventional Operation</u> - Shall provide for direct, simplex, mobile-to-mobile communication on the base station transmit frequency or other frequency, and conventional mobile relay operation

#### Transmission Lines and Antennas

Three types of mobile antennas are to be proposed by Offerors. Antenna types to be proposed are:

Collinear Roof or Tru	ink Mount Antenna:		
Mounting: 3/4" Hole Roof Top Mount			
Gain:	+3 dB with respect to Quarter Wave		
Cable:	Antenna Specialists Proflex or equivalent, minimum 17' in length		
Connector:	To Match Mobile Radio		

On Glass Disguise Ar	itenna:
Mounting:	Glass mount with impedance Coupling Device
Gain:	+3 dB with respect to Quarter Wave
Cable:	RG58U, minimum 15' in length
Connector:	To Match Mobile Radio, detachable at antenna coupling box

Low Silhouette Trans	sit Antenna
Mounting:	Stainless steel bolts/screws over rubber mounting pad
Gain:	Unity
Cable:	Antenna Specialists Proflex or equivalent, minimum 20' in length
Connector:	To Match Mobile Radio

Transit antennas will be used on fire apparatus and school buses to reduce maintenance and antenna damage.

All mobile connections must be weatherproof to minimize corrosion.

## 10.3.2 Portable Radio, 800 or 900 MHz.

#### · General

The portable radio shall meet MIL 810 C & D standards for shock, vibration, salt, fog, dust and rain, and shall consist of weather resistant, FM transmitter, receiver battery power supply and operating controls, all housed in a durable, attractive, weather resistant enclosure. The case of the unit shall fit comfortably in, and permit, one hand operation. Power output of the transmitter shall be 3.0 Watts minimum.

Portable radios supplied under this procurement shall be frequency synthesized and furnished to operate on a minimum of 128 frequencies in the 800 or 900 MHz land mobile band in a trunked mode. Specific channel assignment will be made by the trunking control system. In the event the system control should fail at the MNC, primesite, or individual

site level, an indication will be heard on the unit's speaker and a visible indication shall appear on the unit's display. In the event that trunking capability is lost, the unit shall be switched to a pre-programmed RF channel to operate in the conventional mode. Proposers shall state whether such switching is performed automatically or by an operator's manual act. If both methods are available, automatic switching shall be quoted in the basic bid, and manual switching as a cost reducing option.

The frequency programming shall be accomplished through the use of EE-PROMS. Radios shall be delivered with all necessary channels already programmed. Detailed operational and technical instructions on programming shall also be supplied.

The radio set shall be small, lightweight and rugged. Its weight, including battery, shall not exceed 1134 gm. (40 oz). Solid-state circuitry shall be used throughout. The radio set shall be capable of withstanding severe operating conditions. The portable housing shall be constructed of high impact resistant material. It shall be sealed and gasketed to protect internally mounted circuitry against dust, foreign particles, moisture and splashing water. Opening the battery compartment shall not break the seal to the radio circuitry. Public Safety and Lake Patrol radios shall be water-resistant. Some Public Safety radios, especially used by HazMat or Law Enforcement Illicit Laboratory Teams will need to be intrinsically safe.

The radio shall be single battery operated to insure uniform battery depletion. It shall use a rechargeable nickel-cadmium, nickel-metal hydride, or lithium-ion battery, which shall be quickly and easily removed. Battery life, based on a 10% transmit, 10% receive, 80% stand-by duty cycle, measured in accordance with EIA RS-316 at 250 milliwatts of audio output, shall be at least ten hours. Batteries must be capable of full recharge in one (1) hour or less. Batteries provided must be capable of withstanding a 3' drop test to concrete without damaging battery performance or visibly cracking the battery housing.

The volume and mode selection controls on the Public Safety portable radio models shall be mounted on the top of the unit for easy access. A rotary control knob shall be provided to select fleet/sub-fleets as desired, simultaneously selecting the correct transmitter and receiver digital code. Other controls shall include a volume control/on-off switch. A sealed transmitter "push-to-talk" (PTT) switch shall be provided on the side of the unit, and an emergency switch shall be provided for user defined

quantities of radios. The switch(es) shall not rotate through more than 355 degrees.

Keypads shall be provided for units that require them. All Public Safety radios will have full backlit keypads.

All portables shall be supplied with carrying devices as specified for each agency in the pricing section.

A variable automatic transmit timer shall be provided for carrying all radios which shall turn off the transmitter after a predetermined length of transmission and alert the operator that his transmitter is off with a 1000 Hz tone. The audio output level of the tone shall be independent of the volume control setting and shall be at least 3 Watt.

Public safety speaker/microphone assemblies and materials needed to wear said unit as part of the user's uniform or other clothing shall be supplied in the quantities and for those agencies listed in the pricing section. Further, it must be possible for an operator to remove the public safety speaker/mic assembly from a portable radio without the use of tools, and then operate the radio in normal fashion. Speaker/microphones shall not have antennas on the microphone. All speaker/mics shall used coiled "telephone style" cord to connect the speaker mic to the radio, and shall be available in at least 3 different lengths. Speaker microphones shall be noise canceling. Speaker microphones for the Public Safety agencies shall be water resistant.

Additional equipment specifications are listed below and also in Tables 10-1 to 10-6.

<u>Unit Identification</u> - Shall transmit a digital unit identification when the push to talk switch is depressed

System Compatibility - Radios shall be equipped and compatible with the following trunked system software or firmware related functions:

- Dynamic talkgroup reconfiguration
- System access priority
- Central controller failure operating mode
- Signaling error correction (To correct erroneous fleet or subfleet assignments, software shall provide for the mobile to revert to the signaling channel in the event that a unit is assigned to an incorrect fleet or subfleet.)

- Wide area operation capability
- Selective inhibit and uninhibit
- Visual and audible notification whenever any reduced backbone functionality occurs or operation is localized to autonomous subsystems
- Multikey Encryption (Public Safety radios)

Emergency Alarm Switch - An emergency button/switch shall be provided for those units requiring it in the pricing section, which, when activated, permits immediate access to a channel and alerts the dispatcher of an emergency transmission. When the emergency button is activated, the transmitter operates in its highest priority mode, and the PTT switch can be used to key the transmitter in that mode. No receive audio shall be present unless the PTT switch is first activated.

Proposers shall describe in their proposal how they intend to comply with this emergency call requirement for hand-held radio sets.

Status Tones - Shall provide audible indication of the following conditions:

- System busy
- Call back when channel available
- Central controller failure
- Time out timer activation
- Access to system denied
- Out of trunked radio system range
- Master Network Controller failure
- Other reduced capability indicator

<u>Selector Switches</u> - Rotary selectors and volume controls are strongly preferred instead of rocker buttons. Rotary selectors are required on Public Safety models.

# Battery Chargers

Battery charging units operating from 110V AC, 60 Hz primary power shall be provided. Multi-unit chargers shall be capable of fully charging batteries in two (2) hours or less. All chargers shall automatically switch to trickle charge when the battery is 70% (or more) charged. Miniature meters (scaleless) or lighted indicators shall be provided which will indicate when a battery is charging and also when it is fully charged.

Three types of battery chargers shall be provided:

- Desktop charger capable of holding a single radio unit or battery.
- Multi-unit charger suitable for wall mounting or desktop placement.
- Multi-unit battery charger/conditioner capable of diagnosing/ restoring battery performance.

Each charger provided shall be capable of recharging batteries with the nickel-cadmium, nickel-metal hydride, or lithium-ion battery either connected to, or removed from, the radio set. The charger shall be equipped with manual and automatic full discharge option to first fully discharge the battery to a minimum of 1 volt per cell and then recharge the battery, or else the bidder shall certify that this feature is not needed, because the batteries being supplied are not susceptible to developing "battery memories".

#### 10.3.3 Control Base Station

Remote control of the trunked radio system from various locations within the system is required. Remote control stations, including antennas and transmission lines, shall be provided as listed in the pricing section.

All radio equipment shall be FCC type accepted under Part 90 of the FCC Rules and Regulations. Control Stations shall be equipped with an auxiliary power system capable of sustaining operation for a period of four hours. Rechargeable batteries shall be provided, sealed batteries shall be used. Recharge time shall not exceed 12 hours; chargers shall be included.

Trunked Operation - Shall operate in compatible trunked systems, with the following minimum capabilities:

Minimum Number of R.F. Channels:

128

Minimum Number of Modes:1

200 for Public Safety 100 for non-Public Safety 25 for low tier

A mode is any combination of talk-group and conventional channel.

Conventional Operation - Shall be capable of operating on a minimum of ten 800 MHz conventional RF channels.

<u>Automatic Unit Identification</u> - Shall transmit a digital unit identification on push to talk

<u>System Compatibility</u> - Control Station radios shall be equipped and compatible with software related features of the trunking system:

- Dynamic talkgroup reconfiguration
- System access priority
- Central controller failure operating mode
- Signaling error correction (To correct erroneous fleet or subfleet assignments, software shall provide for the mobile to revert to the signaling channel in the event that a unit is assigned to an incorrect fleet or subfleet.)
- · Wide area operation capability
- · Selective inhibit and uninhibit
- Visual and audible notification whenever any reduced backbone functionality occurs or operation is localized to autonomous subsystems
- Multikey Encryption (Public Safety radios)

Status Tones - Audible indication shall be provided for the following operational conditions:

- System busy
- Callback when channel available
- Central controller failure
- Time out timer activation
- Access to system denied

Additional equipment specifications are found in Tables 10-1-10-6.

# TABLE 10-1\* BASE STATION, MOBILE AND PORTABLE SPECIFICATIONS (PUBLIC SAFETY) GENERAL

11.5				-6111
Number of Modes	1 Tx 1 Rx	128	128	128
Power Requirements	120 Vac, 60 Hz & 12 or 24 VDC	11-16 Vdc, negative ground	Ni-MH or Li -Ion preferred or Nic el- ium, rechar eable	120 Vac, 60 Hz & 12 or 24 VDC
Тетр ие	-30 to +60 C cull P ormance	-30□ to +60□ C Full P formance	-30 □ to +60 □ C	-30□ to +60□ C ull P ormance
Humidity	95% @ 50°C	95%@50°C	95%@ 50° C	95% to 50° C
Duty Cycle	Con uous	20% Tx 100% Rx	10% Tx 10% Rx 80% Stby (10 h ir minimum b I'e	20% Tx 100% Rx
Shock & Vibration		MIL 810 C/D	MIL 810 C/D	MIL 810 C/D

# TABLE 10-2\* BASE STATION, MOBILE AND PORTABLE SPECIFICATIONS (PUBLIC SAFETY) TRANSMITTER

. .

□60 watts	15 w.	3.0 watts	≥10 w
50 □	100		
	50 □	·	50
Note 1(to Table 3-4) -30□/+60□ C	□0.00025% -30□/+60□ C	□0.00025% -30°/+60□ C	□0.0002% -30□/+60□ C
16F3, 16F9	16F3	16F3	16F3
-15 dBm @ 3.3 kHz deviation			-15 dBm @ 3.3 kHz deviation
+1, -3 dB, 6 dB pre-emphasis	+1, -3 dB, 6 dB pre-emphasis	+1, -3 dB, 6 dB pre-emphasis	+1, -3 dB. 6 dB pre-emphasis
□2% @ 1 kHz 5 kHz devi∷ion	□3% @ 1 kHz	<5% @ 1 kHz	□3% @ 1kHz
>-65 dB	>-70 dB	>-50 dB	>-70 dB
□5 kHz	□5 kHz	□5 kHz	□5 kHz
851 - 870 MHz	806 -825 MHz	806 - 825 MHz	806 - 825 MHz
>-50 dB @ 3.3 kHz deviation & 1.0 kHz mo lation	>-40 dB @ 3.3 kHz deviation & 1.0 kHz modulation	>-40 dB @ 3.3 kHz devi tion & 1.0 kHz modulation	>40 dB @ 3.3 kHz devi on &1.0 kHz modulation
	Note 1(to Table 3-4) -30     /+60   C  16F3, 16F9  -15 dBm @ 3.3 kHz deviation +1, -3 dB, 6 dB pre-emphasis    2°6 @ 1 kHz 5 kHz devi ion >-65 dB   5 kHz  851 - 870 MHz >-50 dB   @ 3.3 kHz deviation &	Note 1(to Table 3-4) -30□/+60□ C  16F3, 16F9  -15 dBm @ 3.3 kHz deviation  +1, -3 dB, 6 dB pre-emphasis  □2% @ 1 kHz 5 kHz devi. ion  >-65 dB  □5 kHz  851 - 870 MHz  >-50 dB  @ 3.3 kHz deviation &  @ 3.3 kHz deviation &  2-40 dB  @ 3.3 kHz deviation &  @ 3.3 kHz deviation &	Note 1(to Table 3-4)       □0.00025%       □0.00025%         -30□/+60□ C       -30□/+60□ C       -30□/+60□ C         16F3, 16F9       16F3       16F3         -15 dBm @ 3.3 kHz deviation       +1, -3 dB, 6 dB pre-emphasis       +1, -3 dB, 6 dB pre-emphasis       6 dB pre-emphasis         6 dB pre-emphasis       6 dB pre-emphasis       6 dB pre-emphasis       6 dB pre-emphasis         □2% @ 1 kHz       □3% @ 1 kHz       <5% @ 1 kHz

TABLE 10-3\*
BASE STATION, MOBILE AND PORTABLE SPECIFICATIONS (PUBLIC SAFETY)
RECEIVER

		**	2 9	8 1
Fre men Ran e	806 - 825 MHz	851 - 870 MHz	851 - 870 MHz	851 - 870 MHz
Channel S acin	12.5 or 25 kHz	12.5 or 25 kHz	12.5 or 25 kHz	12.5 or 25 kHz
Modul ion Ac stance	±7 kHz	±7 kHz	±7 kHz	±7 kHz
Fre mency Stability	±0.0001% -30□/+60□ C	±0.00025% -30□/+60□ C	±0.00025% -30□/+60□ C	±0.00025% -30□/+60□ C
Sensiti EIA SINAD	0.35  12dB SINAD	0.35□ 12dB SINAD	0.35 12dB SINAD	0.35□ 12dB SINAD
Sele	≥-80 dB	≥-80 dB	>-70 dB	>-80 dB
Intermed Rejection	≥-80 dB	≥-80 dB	>-70 dB	>-80 dB
Spuri & Image Rejection	>-90 dB	≥-90 dB	>-70 dB	>-90 dB
idio Response	+1, -3 dB, 6d. 'octave de-em h	+1, -3 dB, 6dB/ 'e sh	Note 2	+1, -3 dB, 6dB/o 'e de ih
dio Output	Min. 1 watt,  5% on  max. rated ou out	5 or 10 , □3% d ion @ max. rated output	0.5 watts, □5% distortion @ max. rated output	1.5 watts,min □3% ion @ max. rated out

#### Notes:

- Frequency stability shall be acceptable for simulcast operation. Bidder shall specify.
- Overall audio response of the microphone and all elements of the transmitter shall be between +4 and -6 dB of a dB/octave reference from 800 to 2500 Hz and between +4 and -10 dB from 300-3000 Hz when measured at constant sound pressure level of +104 dB (0.0002 dynes per square centimeter reference). Electrical audio response shall be between +1 and -3 dB of the standard EIA 6 dB/octave pre-emphasis characteristic between 300 and 3000 Hz with the exception of a permissible 6 dB/octave roll-off from 2500-3000 Hz.

# TABLE 10-4\* MOBILE AND PORTABLE SPECIFICATIONS (PUBLIC SERVICE) GENERAL

Number of Modes	48	48
Power Requirem	11-16 Vdc, negative ground	Ni-MH preterred or Nickel-C um, (re char teable
Temperature	-30□ to +60□ C	-30□ to +60□ C oull P ormance
Humi "	95% 50□ C	95% 50□ C
Duty Cycle	20% Tx 100% Rx	10% Tx 10% Rx 80% Stby (8 hour minimum b 1 e)
Shock & Vibration	MIL 810 C/D	MIL 810 C/D

# TABLE 10-5\* MOBILE AND PORTABLE SPECIFICATIONS (PUBLIC SERVICE) TRANSMITTER

RF Output Power	10 watts	3.0 watts
RF Ou lut ledance	50 □	1) 4"
Frequency Stabil	□0,000 <b>2</b> 5% -30□/+60□ C	□0.00025% -30□/+60□ C
FCC Emission Desi ator	16F3	16F3
Local dio Sensitivi		
io Response	+1, -3 dB, 6 dB pre-emph	+1, -3 dB, 6 dB pre h
dio D' ion	□5% 1 kHz	<5% 1 kHz
S urious & Harmonic	>-55 dBc	>-46 dBc
Devi on	□5 kHz	□5 kHz
re men Ran e	806 -825 MHz	806 - 825 MHz
FM Noise	>-40 dB @ 3.3 kHz deviation & 1.0 kHz modul ion	>-40 dB @ 3.3 kHz devi ion & 1.0 kHz modul ion

# TABLE 10-6\* MOBILE AND PORTABLE SPECIFICATIONS (PUBLIC SERVICE) RECEIVER

Fre men Range	851 - 870 MHz	851 - 870 MHz
Channel S racin	12.5 or 25 kHz	12.5 or 25 kHz
Modulation Acc tance	□7 kHz	□7 kHz
Fre tuency Stability	□0.00025% -30□/+60□ C	□0.00025% -30□/+60□ C
Sensiti IA SINAD	0.35 12dB SINAD	0.35
Selecti	>-65 dB	>-60 dB
Intermed Reie ion	>-65 dB	>-65 dB
Spurious & Image Re ection	>-65 dB	>-60 dB
dio Response	+1, -3 dB, 6dB/o 'e de- ih	Note 2
idio Output	5 or 10 watts, □5% distortion @ max. rated output	0.5 watts,  □ 8% distortion  @ max. rated o ut

\* Tables 10-1 through 10-6 set forth specifications for a trunked radio system in the 800Mhz bandwidth. If Proposer wishes to present a solution using 900Mhz bandwidth, Proposer should set forth, in detail, the specifications applicable to that solution that are essentially equal to those contained in these tables.

# SECTION 11.0

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1.	1.3.1 Infrastructure	)
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# 11.0 IMPLEMENTATION & PAYMENT SCHEDULE

## 11.1 Implementation

While it anticipated, at this time, that all participating entities will continue their participation in this project, proposer should be aware that any entity or agency may withdraw from the Coalition after proposals are received and evaluated. In addition, other governmental entities, who are not currently a part of the Coalition, may desire to participate in this project and purchase subscriber equipment at a later date, including after final installation.

The implementation of any system of this size and complexity is a significant undertaking. Consideration must be given to the day-to-day operations of the Coalition agencies, which must not be disturbed or interrupted.

A carefully thought out project schedule and work breakdown structure diagram must be provided with your proposal. The project schedule shall be referenced to the contract signing date, which shall be assumed to be March 5, 1999, as shown in Section 1.0, for the purpose of your proposal. The project schedule and work breakdown structure diagram shall show tasks to be performed by both the Coalition and the Contractor. The project schedule and work breakdown structure should be consistent with the migration plan developed by the Proposer for Coalition agencies move to the proposed trunked radio system.

The project timeline shall include important milestones and logical breakpoints during which the Coalition and Vendor shall assess the progress to date, and prepare for the next phase.

Your timeline should provide as much detail as possible and highlight the following major milestones of the first two stages of the project:

- · Contract Signed and Executed
- Begin training of Technicians Responsible for System Maintenance
- System Staging Completed
- Fixed End Equipment Delivered and Fully Operational
- · Infrastructure Acceptance Tests Completed
- Infrastructure Test Documentation Submitted & Approved
- Coverage Acceptance Tests Completed
- Coverage Test Documentation Submitted & Approved

- Installation of Initial Subscriber Fleet Begins
- Installation of Initial Subscriber Fleet Completed
- 60-Day Burn-In Test Completed
- Infrastructure Accepted, Warranty Begins
- Installation of Additional Agencies Begins

The first milestone of your timeline should be contract signing. All other events will be referenced in number of days from contract signing.

The second major milestone in your timeline should be completion of system staging. At this point, all of the infrastructure equipment required to make a fully operational communications system should be tested together, including, but not limited to:

- Network and site controllers
- Audio Switches
- Alarm and control units
- Representative dispatch consoles and subscribers, programmed with approved templates
- System Management systems
- System Alarm Panels
- Combiners and multicouplers
- Jumper cables cut to size for their end location
- Transmitter site equipment installed in shelters for locations where new buildings will be provided

The fixed end network equipment shall be delivered to the City of Austin, acting as agent for the Coalition following system staging and installation. When the system is fully installed, programmed, operational, and fully tested by the contractor according to agreed upon test scripts, the Coalition shall be notified in writing that the system is ready for testing. Your timeline shall include at least four weeks for a Coalition representative to witness such tests.

The Coverage Acceptance Tests shall not begin until the infrastructure tests have been successfully completed and passed. Documentation of both the infrastructure and coverage test results shall be presented for the Coalition's review following successful completion of the coverage tests. Your timeline will allow at least 3 weeks for the Coalition to review and approve the test documentation after all testing has been completed.

## 11.4 Extension of Project Schedule

Installation and satisfactory operation of the system must be completed within the period specified herein, or the time guaranteed by the Proposer in the project schedule submitted with the proposal, whichever is shorter. Extension of time for completion is unlikely especially if such extension would cause loss of funds appropriated to pay for this project.

Project extensions will be granted if delays are experienced as the result of

- · Actions taken by the Coalition, or its agents
- · Changes ordered by the Coalition
- Difficulties experienced in obtaining F.C.C., F.A.A. or zoning approval of proposed facilities, assuming approval requests were filed in a timely manner, and diligently pursued.
- Road repairs, mishaps, strikes, Acts of War, Acts of God, riots, lockouts or inclement weather which would delay equipment or limit access to any site at which work will be required

Should the Contractor fail to complete the project within the specified completion schedule, the sum of \$5,000.00 per calendar day will be deducted from the monies due the Contractor for purchase of the equipment/services. This sum shall not be considered as a penalty, but rather as reasonable liquidated damages, since it would be impracticable or extremely difficult to fix the actual damages. An extension of time may be allowed for delays beyond the control of the Contractor at the discretion of the Coalition or Buyer.

Requests for time extension(s) shall be submitted to the Coalition, in writing, by the Contractor. The request shall describe the type of delay, the cause and its apparent impact on contract delivery/completion schedules. The Contractor shall make such requests on the Friday of each week that potentially excusable delays occur.

- Staging shall not take place above 36° N latitude between the months of November and March.
- c) The location for the new Regional Emergency Communication and Transportation Management Center has not been identified yet. The Coalition is still in a process of working to design a new center, and the location has not yet been determined. Consequently, no exact date for its completion can be provided at this point. Proposers are therefore required to present a plan to provide for control and operation of both the existing conventional and new trunked systems, including the receipt of both emergency ID and alarm of both systems, as described in Section 9.

# 11.3 Payment Schedule

#### 11.3.1 Infrastructure

Payments will be made as key milestones are reached, in accordance with the following schedule:

1.	Detailed Design and Drawings Completed	10%
2.	Fixed Network Equipment Shipped & Received	20%
3.	Fixed Network Equipment Delivered and Installed	20%
4.	Fixed Network and Coverage Acceptance Testing Completed & Passed:	20%
5.	Initial Subscriber Fleet User Radios Installed:	10%
6.	System Acceptance:	12%
7.	Retainage on Milestones 1-5:	8%

# 11.3.2 Subscriber Equipment

Payments will be made for the installation of agency-specific subscriber equipment as follows, on a per agency basis:

1.	Subscriber Equipment Shipped & Received:	20%
2.	Subscriber Equipment Consoles Installed:	20%
3.	Subscriber Mobile/Portable Radios Installed & Programmed:	20%
4.	5% of Units Tested:	20%
5.	Agency Acceptance:	12%
6.	Retainage on Milestones 1-4	8%

Upon successful completion of the "Burn-In" period, the Contractor begin removal of existing Coalition-owned infrastructure equipment as authorized by affected Coalition agencies and the Coalition Project Manager. Infrastructure equipment shall include associated control cables, antennas, and transmission lines. Towers shall be cleaned of any existing mounting hardware, grounding straps, etc., and shall be appropriately finished. Any proposed removal of existing infrastructure equipment shall be included in the vendor's comprehensive migration plan as detailed in Section 6.0.

Old infrastructure equipment will be conspicuously labeled with the following information:

- Site Name
- Make, Model & Serial No.
- Owner Agency / Entity
- Associated Accessories or Options
- Frequency Information

Infrastructure equipment will be carefully inventoried as it is removed, and shall be stored in a Coalition designated location within Austin / Travis County area.

The first two stages of the project shall be considered complete when all aspects of the Contract and Statement of Work have been fulfilled, the system has been completed, the 60-day Burn-In period has been successfully passed, all old infrastructure equipment has been removed, the Dispatch Centers utilized by the Initial Subscribers have been completed, all software is of the latest version, and all required documentation has been completed and approved.

The third stage of the project shall consist of the installation of additional agencies. Coalition agencies will enter into contract agreement with the successful proposer on an individual basis. The pricing, terms, and conditions of the final contact negotiated on behalf of the Coalition for the first two stages will be extended to the remaining agencies that make up the Coalition.

#### 11.2 Time Constraints

a) Coverage testing will only take place between the months of May and September, when full foliage conditions exist.

Non-Public Safety user training and subscriber installation should be scheduled to begin one month after completion of the Coverage Acceptance Test. This will provide ample time for the Coalition to review all test documentation, and time for the Contractor to cure any deficiencies. This will also allow the Contractor time to prepare for the Coalition's migration to the new system, which will include training all users and issuing radio equipment. Initial Subscriber Fleet will be added to the system first. For the purpose of your proposal, it shall be assumed that the some agencies will be installed prior to the 60-day operational test. At this time, the Coalition expects that this stage will include Austin Water & Wastewater, the Texas House of Representatives, the Texas Legislative Council, and at least one Constable precinct. Selected public safety personnel will also begin using radio, both portable and mobile, on the new system during this phase for evaluation purposes.

During the training and installation phase, dispatchers will be trained to use their new equipment first. Users will then be trained in the operation of mobile and portable radios, and will be issued their portable radios. Dispatchers will then convert to using the new system.

New mobile radios will be installed last.

The 60-day operational test, or Burn-In period, shall be scheduled to start upon written notification to the Coalition that the Initial Subscriber Fleet user training and subscriber installations have been completed.

If the system performs as specified for 60 consecutive days, and without a major outage, as defined in the Glossary Section 19, then the system infrastructure will be considered accepted. Any major outage may, at the discretion of the Coalition's project manager, reset the operational test period clock. The project manger's decision to reset the clock should be based, in part, upon the source and severity of the failure as well as the operational impact suffered by the users.

The system will be observed during this period to ensure that it performs as specified. Any failure to perform as specified in the contract will be remedied before the infrastructure is accepted.

The Public Safety migration to the new system will follow the same process as the Initial Subscriber Fleet agencies, but will not begin until the 60-day operational test for the Initial Subscriber Fleet agencies has been successfully completed.

# SECTION 12.0

#### INSTALLATION AND DOCUMENTATION 12.0 12.1 General 1 Communication Sites 3 12.2 12.2.2 Antennas and Transmission Lines 4 Mobile Radio 6 12.4 12.5 As-Built Installation Documentation 8

## 12.0 INSTALLATION AND DOCUMENTATION

### 12.1 General

All installation work performed shall be in accordance with laws and regulations of the U.S. Department of Labor, the State of Texas and Travis County.

The Contractor shall provide all the necessary personnel, tools, equipment and transportation for the successful installation of all equipment provided.

At a minimum, the Contractor shall provide at least one Project Manager, on site, full time (Site Manager).

The Site Manager shall oversee all aspects of system implementation, including site preparation, equipment programming, staging, installation, etc. Other individuals may assist the Site Manager in various functions such as reporting, accounting, testing, optimization, etc., but this individual shall have primary responsibility for the performance of the system.

The On-Site Manager shall focus solely upon the Radio Communication project from contract signing to acceptance of the system.

Proposers are required to describe their full project team, indicating which roles will be played by each team member. Project experience and references for each team member are required.

The Contractor is responsible, and shall provide all the hardware and supplies necessary for the proper and complete installation of all equipment. This includes bolts, clamps, wire wraps and other hardware, as required.

It shall be the responsibility of the Contractor (the successful Proposer) to provide a <u>turn-key installation of the communications system</u>. Optimization, trouble shooting, and adjustment of each subsystem shall be the Contractor's responsibility. Installation shall include the removal of existing mobile radio equipment and ancillary subsystems that will be replaced under this procurement. All equipment removed from service shall be kept together with any associated parts, cables, accessories, etc. Care shall be taken to prevent damage to any equipment parts, cables or accessories. These items shall be inventoried by the Contractor as they are collected, and shall be returned to a storage facility designated by the City.

User equipment shall be individually boxed and sealed in suitable cardboard boxes, and labeled with the following information:

- User Agency Name
- Equipment Make, Model No. and Serial No.
- Associated Accessories and Options

To the extent possible, the existing radio communications systems shall remain fully operational during installation of the new system and until the Coalition provides final acceptance. Because existing systems support current operations, interruptions in service due to Contractor or contractor activities cannot be tolerated. If interruptions in service are deemed by the Contractor to be unavoidable, written notification, detailing the nature and duration of such interruptions shall be provided to the Coalition for review and approval no less than 30 days before the interruption is to occur. In the event that the Contractor or associated subcontractor causes a major outage resulting in loss of a repeater site, microwave link or console system, the Contractor shall be assessed \$5,000 for each occurrence, and for each day that the outage continues.

Equipment shall be installed in a neat and workmanlike manner, in accordance with good practice, by competent technicians or mechanics. Inspection and approval of all installations will be provided by personnel designated by the Contractee. Such approval shall be limited in scope to the specific subsystem physical installation, and shall not be construed to imply full acceptance of the system, or subsystem.

Adjustment or alignment of any transmitter or receiver shall be performed by technicians holding a valid Federal Communications Commission General Radiotelephone Operators License, or its approved equivalent.

Subcontractors performing installation of any equipment or subsystems shall be identified in the Proposer's proposal. All installation subcontractors' experience and qualifications to perform the tasks associated with this procurement shall be outlined in the proposal.

Notwithstanding the details presented in these specifications, it is the responsibility of the Contractor to verify the correctness of the material lists and suitability of devices proposed to meet the intent of the specifications. The Contractor shall be responsible for providing or arranging for all parts necessary for the equipment and its installation up to and including final system acceptance.

Any equipment or parts required to provide a complete and operational system, and not specifically mentioned herein, shall be provided by the contractor without any claim for additional payment. It shall be understood that the contract and agreement contemplates and requires the turn-key construction and installation of a completely operational communications system which meets the standards of the Radio Communication Coalition.

Mobile installations performed in vehicles that are equipped with air-bag protection devices shall be installed in a manner that will not in any way impede the ability of the air bag to protect the occupants during a collision.

#### 12.2 Communication Sites

The contractor shall be responsible for the installation of all of the necessary components associated with the communications system described in these specifications. The Contractor shall furnish all tools, test equipment, supplies and services necessary to provide a fully operational and satisfactory communication system for the Coalition.

## 12.2.1 Repeaters

- The installation of the radio frequency equipment will be provided by the contractor at the designated location(s) within the equipment shelters at the base station sites. The Contractor shall supply and install all required equipment, accessories, punch-blocks, terminal strips and/or cables needed to interface to new and/or existing facilities.
- It is preferred that all audio and control cable/wiring to and from the radio equipment be shielded. It is preferred that cable/wiring interfaced to the Public Switched Telephone Network be shielded up to the demarcation punch blocks.
- All external equipment inter-cabling, whether RF, AC, AUDIO or CONTROL cables and/or wiring, shall be labeled with pre-printed adhesive wire labels. Markers shall be placed at each end, adjacent to the connector, plug or terminus. For cables and/or wiring, within the shelter, markers shall be placed at three (3) foot intervals along the length of the cable and/or wiring. This data shall be recorded in the installation documentation.
- All equipment cables or cable bundles within the shelter, to the greatest extent feasible, will be neatly tied by means of plastic tie wraps and secured by clamps to flat surfaces.
- All cable/wiring bundles exiting the equipment must do so through the top of the cabinets. Rubber grommets or other suitable protection shall be used at cabinet knockouts to protect the cable/wiring. Splicing of AC, AUDIO or CONTROL cable/wiring will not be permitted.

#### 12.2.2 Antennas and Transmission Lines

- For each cable provided, the coaxial antenna transmission line shall be cut to length. The radio equipment end of this line shall terminate at a point where the lengths of jumper cables are kept as short as possible. This terminus shall be secured to a wall or ceiling surface.
- All coaxial antenna transmission line connectors shall be type 'N'. The ends of the transmission line shall not connect directly to the antenna, to any RF equipment interference protection or multiplexing devices.
- The transmission line shall be fastened to the external antenna support structure in accordance to the manufacturers specifications or every four (4) feet for vertical runs, whichever is smaller. Fasteners shall be of stainless steel; nylon cable ties are not acceptable.
- Transmission line runs inside equipment shelters or buildings shall be supported, every three (3) feet, with stainless steel cable hangers. Multiple cable runs shall not be bundled together, but rather, shall be strung and supported adjacent to each other.
- All coaxial jumper cables shall be 1/2" diameter (such as Andrew Superflex model FSJ4-50B), or approved equal.
- The jumper cables shall be used to interconnect all interference protection or multiplexing devices with the coaxial antenna transmission line and radio frequency equipment.
- A jumper cable shall be used to interconnect the antenna(s) to the top end of
  the coaxial antenna transmission line. Jumper cables used to reach a side arm
  mounted antenna shall be shaped to form a drip loop. Jumper cable
  interconnections shall be weather proofed by installation of 3M cold shrink
  weather proofing kits, Andrews Type 241XXX or equivalent. The use of vinyl
  tape is not acceptable for this purpose.
- All jumper cables shall be cut to length and shall use type 'N male' connectors
  except as dictated by the connector supplied with the antenna.

- To meet cable bending specifications for strain relief purposes, equipment cabinet intra-cabling will be permitted by the use of 1/4" diameter, such as Andrew Superflex, or RG-142 double shielded coaxial cable. These cables shall be limited to:
  - 6 feet in length
  - Interconnection between the equipment RF port(s) and the cabinet feed-throughs or the first interference protection or multiplexing devices.
- All coaxial cables exiting the equipment cabinets shall do so through cabinet feed-throughs. The feed-throughs shall be Celwave model PD-395, or approved equal.

#### 12.3 Communications Consoles

#### 12.3.1 General

The installation of the new consoles and associated equipment shall be provided by the Successful Contractor at all designated locations specified in Section 9, Dispatch Facilities.

The Successful Contractor shall supply and install all required punch blocks, terminal strips and/or cables needed to interface the new console electronics to existing facilities such as radio equipment, telephone equipment, logging recorder equipment and/or auxiliary function and/or control circuits.

All new console intercabling, including those which are to terminate at existing punch blocks, shall be labeled with pre-printed adhesive wire markers. The markers shall be placed at each cable end, adjacent to the connector or plug. All cables and/or cable bundles will be hidden from view and will be neatly secured by means of plastic tie wraps.

All intercabling to the operator positions and to the central electronic switch(es) shall be provided with sufficient slack to permit movement of at least five (5) feet in any direction.

## 12.3.2 Physical Interface Requirements

The Successful Contractor shall be responsible for the physical switch(es) between the radio system and the communications console.

The physical interface is expected to include, at a minimum, the following

- Wire connections from telephone company provided circuit termination block(s) to the appropriate console punch block(s).
- Wire connections to corresponding terminal and source locations on voting comparators, audio distribution networks, and consoles.
- Proper termination of all used and unused I/O ports on voting comparators and audio distribution networks.

## 12.3.3 Functional Interface Requirements

The Successful Contractor shall be responsible for the functional interface(s) between the radio system and the communications consoles.

The functional interface is expected to include, at a minimum, the following:

- Adjustments of input signal level(s) from voting receivers to comparators
- Adjustments of output signal level(s) from voting comparator to consoles
- Adjustments of output signal level(s) from corresponding base station interfaces
- Adjustments of input signal level(s) to audio distribution networks from corresponding base station interfaces
- Verification of necessary base station control format(s)
- Adjustments of the level and duration of the output signal(s) from the corresponding base station interface

### 12.4 Mobile Radio

It is a requirement that the vendor be capable of performing all mobile radio installations at a location provided by the Successful Contractor which has an indoor secured facility, or at a location provided by the end user. Pricing shall include all the appropriate costs. The

facility provided by the Successful Contractor shall be located within the City of Austin, if feasible, and shall be subject to Coalition approval. Mounting requirements will be supplied to the Successful Contractor.

Mobile unit installations are to become operational in the first phase, and shall not begin until the main site and the console electronics are installed and operational. Training for the console operators and mobile radio operation training for each agency shall also be performed before the trunked mobile radio units are installed.

The Successful Contractor shall not remove the existing radio unit when installing the new trunked mobile radio in all cases.

At a mutually agreed time of installation, the Successful Contractors will be given information as to the physical vehicle placement of the mobile units for each agency and radio user. This work may include relocation of existing equipment. If the agency has not provided the proper information by the scheduled time of the installation or does not provide the vehicle at the proper time, the agency shall be responsible for any additional expenses. Offerors are to provide, as part of the RFP response, the cost for such rescheduling of the mobile installation.

All coaxial cable connectors shall be soldered to its cable or to its interface circuitry. Crimpstyle connectors for this application are acceptable. Low loss Teflon antenna cable is preferred.

All wiring shall be appropriately dressed and connectorized in accordance with good engineering practices. All main power leads shall be connected as close as practical to the battery using approved methods and hardware. Each main power lead shall be attached to its own in-line fuse rated for the maximum current drain of the associated circuit. Obtaining power by connecting to existing radio equipment or any other device is unacceptable.

All cabling that is exposed shall be dressed with a flexible tubing and secured to the vehicle frame by typing to any stationary support element using solid copper wire or fasteners. Plastic tie wraps should be used within at least 2 feet of the end connection points in areas not directly exposed to the weather.

The cable length shall allow repositioning the equipment within a radius of 5 feet to allow for changing operating conditions. A representative from each agency shall inspect the first installation of equipment. An agency representative will inspect each vehicular installation. Each vehicular installation shall successfully complete an operational performance test and shall be approved via signature of the City agency inspector.

The mobile assembly shall be positioned on a mounting assembly such that the mounting plates, base plates, brackets, etc., are of 18-gauge steel construction. The support bar, of similar high steel gauge construction, bolts, support plates, etc., shall be coated with a high-

quality black matte finish. The finished assembly shall be secured and remain in a fixed and motionless position under all operating conditions, excluding physical vehicle accident.

#### 12.5 As-Built Installation Documentation

Thorough "as built" documentation shall be provided by the Contractor and delivered to the City's Project Manager. Four (4) copies of the documentation shall be provided in 3-ring binders and on diskettes in the original software format, including AutoCAD, Excel, and Word for drawings, spreadsheets, and text. At a minimum, the following "as built" documentation shall be included in each set:

- A general system manual that describes the overall system and its operating modes.
- System block diagram.
- Site layouts and floor plans of each equipment site, and dispatch facility, to scale.
- Rack face drawings, to scale.
- Drawings showing cable tray location details, to scale.
- Microwave system map identifying each site, antenna make, model and orientation, and frequency of operation.
- Radio propagation coverage maps.
- Coverage Acceptance Test documentation.
- All external equipment inter-cabling, whether RF, AC, AUDIO or CONTROL cables and/or wiring, shall be labeled with pre-printed adhesive wire markers.
   Markers shall be placed at each end, adjacent to the connector, plug or terminus.
   For cables and/or wiring, within the shelter, markers shall be placed at three (3) foot intervals along the length of the cable and/or wiring.
- Interconnection drawings that show all connections between sub-assemblies, such
  as terminal boards, panel assemblies or other equipment, and which external
  connections are made, shall be provided.
- Numbering and labeling of all cabling associated with remote control units.
- Numbering and labeling of all connections to punch blocks associated with the control consoles.
- Numbering and labeling of all interconnecting cabling between repeaters, the central control, any remote site controllers or processors, alarm circuits, and leased telephone company circuits, and the microwave system.

- A log of level settings for all control circuits.
- A record of any telephone circuits interconnected with the radio telephone interconnect system by circuit number and telephone number for service on these circuits.
- A microwave channelization plan.
- A Fiber-Optic utilization plan
- Documentation and labeling of transmission line routing and antenna mounting at all fixed sites, with detailed drawings showing all mounting hardware and accessories.
- Complete set of maintenance and operations manuals shall be provided for each category of equipment purchased in association with this project. A systems manual shall also be provided, showing the system layout and architecture and describing the function of each major system component.
- Manuals for OEM hardware shall be provided for each component of the system by the manufacturer, showing the system layout and architecture and describing the function of each major item.
- Any unique wiring configurations or circuit modifications that are not part of the standard equipment documentation provided, shall be included in the ring binder.
   All information as described in the previous paragraph shall be included, in addition to the theory and method of operation.
- A complete inventory of all provided equipment and software including model numbers and serial numbers, in printed form and in the latest version of Microsoft Access.
- Final fleetmap configuration, with all group I.D.'s and aliases.
- A complete roster of unit I.D.'s and aliases.
- Documentation of final programming configuration for all software programmable equipment.
- 32≅ diskettes with a copy of all equipment programming templates used in the system.
- Copies of the Hardware Acceptance Test Plan, with all recorded measurements.

# SECTION 13.0

13.0 ACCEPTANCE TESTING	
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# 13.0 ACCEPTANCE TESTING

## 13.1 Factory and Field Testing

The Radio Communications Coalition requires both standard commercial type factory testing and field tests to verify operational compliance.

## 13.2 Factory Tests

The vendor shall provide for a staging area to permit the system to be tested prior to permanent installation at the sites.

This test shall simulate as closely as possible the final configuration of the system. It shall permit the Coalition's representatives to become familiar with the system and test the system features.

The following system components shall be part of the staging area test:

- main, redundant and remote trunked system controllers
- master audio switch/network controller
- · all site repeaters
- · all antenna multiplex equipment
- all voting comparators (if any)
- a communications console from each agency
- · simulcast equipment
- microwave equipment, including radios
- trunked system management computer
- representative field equipment

Three certified copies of factory tests reports shall be submitted to the Coalition for approval before the equipment is released for shipment.

# 13.3 Field Acceptance Testing and Proof of Performance

Following final installation of all subsystem components at their end location, performance and operational tests shall be performed by the Contractor to verify proper operation of all subsystems and features of the system. Acceptance testing will be performed prior to final

system acceptance by the Coalition, and successful passage of the acceptance test plan will be a condition of final acceptance and final payment. All test equipment required for the ATP shall be provided by the Contractor.

Each Proposer must submit with the proposal a preliminary acceptance test plan detailing the procedures to be followed, the equipment to be used, and the pass/fail criteria to be used to verify system performance. Upon notification of award, a final acceptance test plan shall be submitted for review and approval prior to execution of a Contract.

# 13.4 Operational Performance Tests

The Operational Performance Tests will include the following basic test procedure:

- Verify that all equipment is delivered and installed in a workmanship-like manner according to the Contract.
- Demonstration that all equipment meets specification.
- Verification that all functions and features are performed according to specification and Contract requirements.

The plans shall consider, at minimum, the following functions:

# 13.4.1 Trunked System Features

- Automatic unit identification
- · System access time; analog, digital, and encrypted
- Emergency alarm function, with and without all voice channels busy
- · Talkgroup selection (mobile, portable and control)
- Fleet regrouping from control terminal
- Trunked controller failure software mode
- Power failure at trunked controller
- Site commercial power failure
- Trunked signaling channel failure
- Repeater failure
- Trunked site failure
- Master Network Controller failure
- Queuing capability
- Emergency access to voice channel, all channels busy

- · Operation of equipment alarm functions
- Operation of talk-group database
- Modem functions (data links between sites)
- Remote site controller failure
- Interface as appropriate to other radio systems for interoperability purposes

# 13.4.2 Microwave Subsystem Functions

- Fade margin verification (all paths)
- Signal to noise performance of loaded system
- · Operation of loop protection
- · Frequency of transmitters
- Time domain reflectometry of transmission lines
- RF output power
- Alarm functions (internal & external)
- Operation of channel modules
- · Operation of pilot tone stop filters
- Operation of service channel
- · Verification of proper orientation of antennas
- Completed system licensing

# 13.4.3 Base Repeater Functions

- · Transmit frequency and deviation
- · Output and reflected power
- Receiver sensitivity
- · Receiver multicoupler gain
- Receiver preamplifier gain
- · Time domain reflectometry of transmission lines
- Frequency domain reflectometry of transmission lines
- Transmitter combiner loss
- Alarm functions
- System optimization
- Proper setting of audio phase delays
- Receiver audio output levels
- · Voting system function and level adjustment

- Proper operation of frequency standard
- · Proper operation of standby frequency standard

#### 13.4.4 Communications Console Functions

- Proper operation of all conventional base station control modules and functions
- · Proper operation of all signaling and encoding functions.
- · Adjustment of control line levels to proper levels.
- Proper operation of volume and mute controls.
- Proper operation of headset interfaces and volume controls.
- Proper operation of cross patch functions.
- Proper operation of instant call recorder/playback unit.
- · Proper operation of relay controlled external devices.
- Proper operation of preprogrammed simulcast or group control functions.
- Proper operation of clocks, meters or other displays contained in console.
- Operation of self diagnostic and testing features contained in the console electronics through simulation of failures.
  - Proper operation of talkgroup control modules on trunked channels.
  - Proper operation of automatic number identification and emergency identification functions.
  - · Proper operation of Alerting system

#### 13.4.5 Mobile and Portable Radio Functions

- Proper operation of talk-group selector switches.
- Proper operation of automatic unit identification and emergency switch.
- Transmit frequencies
- Transmitter output and reflected power.
- Receiver sensitivity.
- · Operation of accessory functions.
- Proper operation of conventional base station selector (if used).
- Call alert
- Talk-group scan
- Emergency alert
- Encrypted operation

Mobile and portable testing will be documented by the vendor. 5% of each subscriber type will be randomly selected and evaluated in conjunction with the testing.

# 13.4.6 Control Station - Remote Control Subsystem Functions

- Measurement of forward and reflected power
- · Transmit frequency and deviation
- · Receiver sensitivity
- · Time domain reflectometry of transmission line
- · Proper fleet and talkgroup operation
- Operation of remote control functions (if used)
- · Proper installation and orientation of directional antenna

# 13.4.7 Wide Area Operation

The coverage testing procedures detailed in Section 4.3 will be followed.

- Verification of wide area operation within APCO-16 guidelines
- · Site/system switching parameters
- Site/system switching operation

# 13.4.8 System Management System

- System configuration
- Subscriber access management
- Manager partitioning
- Diagnostic management
- Dynamic radio commands
- Selective inhibit/uninhibit
- Activity reporting
- User database maintenance
- Activity monitor
- · Automatic backup controller database updating
- Alarm system

### 13.4.9 Master Audio Switch/Network Controller

- Automatic switching to backup
- · Alarm Monitoring and Diagnostic Functionality
- Signaling (Control) Channel Backup
- Disablement of Failed Voice Channels
  - Low forward power
  - High reflected power
  - Unidentified carrier on unassigned voice channel
  - Signaling interface failure between base and controller
  - Audio circuit failure between controller and base
  - Voter receiver failed
  - Voter receiver disabled
- System Usage Reports
  - System configuration
  - Configuration information for all components in the system
  - Functional configuration of controllers, channels and sites
- Subscriber Management
  - Manager database (list of system managers)
  - Logged on managers
  - Regrouped radios
  - Inhibited radios
  - Storm plans
  - Commands (tasks)-in-Progress (regroups, inhibits)
  - Subscriber configuration and attributes (by individual, talkgroup and multigroup)
- Channel Usage
  - Identification of calling units by talkgroup and unit identification number
  - Time of channel access
  - Duration of transmission
  - Classification of call
  - Channel assigned
  - Site or Sub-system involved in a call
- Fault Management
  - Current alarms
  - Alarm history (daily, weekly, monthly)
  - Alarm history (by component)

- Technician notes
- Channel Access Priority Levels
- Dynamic Talkgroup Reconfiguration
- Selective Disablement of Field Units
- Control of Time Out Parameters
  - Channel Hang Time (message trunking)
  - Interfering Carrier Time (length of time channel remains enabled with an interfering carrier)
  - Remote Link Failure Time (length of time site remains enabled without a remote site data link)
  - Channel Fade Time (length of time channels remains assigned without a carrier or low speed data present)
  - Emergency Call Time (length of channel hang time when an emergency call is initiated)
- · Channel Partitioning

# 13.4.10 Equipment Delivery & Installation

- Appearance
- · Cabling neatness
- Labeling
- Completeness, accuracy, and readability of documentation and drawings

# 13.4.11 Coverage Verification Tests

The following categories of tests will be performed:

- In-building for the specific buildings listed in Section 5
- In-building for random buildings throughout the portable service area
- · Portable on-street testing
- Portable on-street testing of designated "critical areas"
- Portable testing of specified underground locations
- Mobile coverage throughout the mobile service area
- · Mobile signal strength testing

Personnel from the Coalition and the Contractor will be present to rate the quality of the transmission.

The coverage testing procedures detailed in Section 5 will be followed.

# SECTION 14.0

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## 14.0 TRAINING

## 14.1 Training

A comprehensive training program for all operational personnel shall be provided by the successful Proposer prior to cutover and final acceptance of the system. Such training shall include, at a minimum, sessions to familiarize dispatch center personnel with the operation of the trunked, microwave and alarm systems and with the control center equipment. Field personnel will be trained in the operation of mobile and portable equipment. The proposal must specify the amount of classroom training to be provided to operations personnel. A syllabus of the training program must be provided in your proposal. The Coalition reserves the right to video tape classes.

Written materials and any audiovisual aids produced by the Proposer to provide system operation training shall be furnished to the Coalition for continuing education purposes.

Offerors are to submit a resume for each proposed trainer, a list of training classes, and prior client references who have been trained by the vendor's training personnel. The Coalition shall interview the Offeror's training team, and shall mutually agree on the training package and the qualifications of the training personnel prior to the development and execution of the training program.

The first training class in each category will be given to Supervisors and Department Heads of the agencies involved. Any deficiencies in the training program will be corrected before the rest of the affected personnel are trained. Training for the Department Heads will begin after completion of the fixed end hardware tests.

The Coalition currently has an in-house staff of radio technicians. If they are selected to oversee and maintain the new system, they will need to attend your technician training course to become familiar with system maintenance, programming, and problem diagnosis and correction. If in-house staff are utilized, technician training shall also be an ongoing process during system implementation, as they shall be involved in the installation and optimization of the system.

Your proposed training program shall include the recommended level of technician training to enable the Coalition's technicians to maintain the system. The proposed cost for technician training and system maintenance training courses shall be separately itemized to allow the Coalition to reach decisions regarding ongoing maintenance of the installed system. Please refer to Section 15.2.5 for additional information on future maintenance plans.

At minimum, the proposed training program must meet the following guidelines:

FIELD US	SER EQUIPMENT
Number of sessions	20
Students/session	10
Туре	Hands-On Instruction
Location	Austin
DISPATCH (	Console Systems
Number of sessions	20
Students/session	4
Type	Hands-On Instruction
Location	Austin
Syste	m Manager
Number of sessions	1
Students/session	6
Туре	Hands-On Instruction
Location	Vendor=s Recommendation
System	MAINTENANCE
Number of sessions	4
Students/session	5
Туре	Hands-On Instruction
Location	Vendor's Recommendation
TECHNI	CIAN TRAINING
Number of sessions	4
- Students/session	5
- Туре	Hands-On Instruction
- Location	City Radio Shop; Shop
	Manager, 1 session, 1 week
	VendorÆs headquarters

## 14.2 Field User Training

The successful proposer shall provide a comprehensive training program for field users based upon the Train the Trainer approach. The Coalition shall identify an appropriate number of designated trainers who shall be trained by the selected vendor. Participants will have been successfully trained if they can then successfully train their own personnel.

Training of trainers shall begin after the fixed end hardware tests are complete, while dispatchers are also being trained. Users will be trained after all instructors and dispatchers have been trained.

Vendor personnel will certify that trainers have been successfully trained by sitting in on the trainers Æ first classes.

User classes will include, at a minimum, the following topics:

- overview of the new system
- overview of simulcast and multi-site / multi-system network operation
- · area of operation; coverage provided
- · comparison of old and new systems
- · operation of all subscriber features
- operation and control of mobile radios
- operation and control of control stations
- hands-on familiarization of all equipment functions
- · proper use of all associated accessories
- proper radio procedures

# 14.3 On-Site Dispatcher Operator Training

Dispatch console training shall also use the Train-the-Trainer concept. The Successful Contractor shall conduct comprehensive classroom operator training in two separate sessions. Session 1, will be for all of the dispatch personnel Trainers before the new console system is placed in service. This will be conducted in a classroom environment, using training aids and a model of the dispatch radio console. Training aids such as videos, system diagrams, training manuals showing functionality, and a qualified instructor shall be available for these classes. There shall be handouts available for all attendees. There shall be five (5) copies of the Dispatcher Operator Training manual for future reference and follow up training. In addition, the Operator's Training manual shall be available in an electronic version such as PDF (Portable Document Format) and read with the Adobe Acrobat Reader software.

Two CD ROM copies shall be supplied.

An additional training class, Session 2, shall also be conducted using operational console equipment. This will be conducted in the new or current dispatch centers utilizing the training consoles. Each trainee shall be certified by the instructor to have a complete understanding of the new console operations and to be experienced and fully qualified to operate the new consoles, and to instruct others in their use.

The training schedules shall be arranged and conducted for a minimum of five two-session classes. Each student shall attend session 1 and 2 (once) as a minimum. The classes shall be scheduled in cooperation with the Coalition to minimize the impact on shift personnel. The Successful Contractor shall provide, in addition to the training plan, and handout material, 4 video tape copies that would instruct the user on the use of the operational functions and features of the console system.

# 14.3.1 Operator's Instruction Book

The Operator's Instruction Book shall be clearly written and illustrated to instruct radio dispatch personnel in the proper use of all standard features available for the consoles. Drawings and/or photographs shall show the location of all operator controls. This manual shall be provided in addition to all other manuals furnished. A quantity of 25 Operator's Instruction books shall be furnished as part of the base system. These instruction books shall be available in an electronic version such as PDF (Portable Document Format) and read with the Adobe Acrobat Reader software. Two CD ROM copies shall be supplied. Copying of the CD ROMs shall not be tied to a specific copying quantity license.

# 14.3.2 Operator's Course Content

The following outline indicates the minimum content to be covered by each course:

- · Overview of the new system
- Comparison of old and new systems
- · System failure and backup modes
- Hands-on familiarization of all equipment functions
- · Proper radio procedures
- Basic troubleshooting techniques
- Explanation of simulcast

# 14.4 System Manager Training

The System Manager training course will be a comprehensive program designed to familiarize the Radio System Managers with all available features, reports, and diagnostics. Two levels of training will be required: one for the System Manager(s), and a second for department heads who will require access to some of the features of the System Management packages.

The System Manager classes must include, at a minimum, the following topics:

- · overview of the new system
- · comparison of old and new system
- · explanation of simulcast and receiver voting
- operational theory of all system components
- · detailed discussion of system failure modes
- · basic troubleshooting techniques
- · available features
- · available reports
- available diagnostics
- · development and maintenance of system databases
- · detailed discussion of alarm system
- hands-on familiarization with all of the above

System Management training for department heads should be one day courses designed to introduce them to the features and functions to which they will have access, including, but not limited to:

- snapshots
- · disable/enable radios in their department
- system utilization by their radios and talkgroups
- · basic report generation

# 14.5 System Maintenance and Technician Training

The Coalition already has an in-house staff of radio technicians. If they are selected to oversee and maintain the new system, they will need to attend your technician training courses to become familiar with system maintenance programming, problem diagnosis and correction. Your technician training program should also include hands-on instruction on the actual system as it is being installed and optimized. Costs for this training program must be quoted separately.

The technician training courses shall cover, at a minimum, the following topics:

- · overview of the new system
- block diagram and circuit description

- · comparison of the old and new systems
- explanation of simulcast and receiver voting
- operational theory of all system components
- · principles of digital transmission
- proper operation of system capabilities
- system failure modes
- system diagnostic alarms
- installation and turn-on procedures
- operation of all required test equipment
- alignment and testing procedures
- detailed troubleshooting procedures
- unit/module replacement procedures
- detailed repair procedures
- detailed maintenance procedures
- proper record-keeping
- detailed review of system documentation structure, numbering system, and documentation control process
- operating, safety, and traffic continuity procedures
- · detailed preventative maintenance procedures

Each of the items above shall be conducted with substantial hand-on involvement using equipment provided by the successful contractor or third party suppliers as part of this system.

# 14.6 Off-Site Training

For all off-site training courses, please list the courses available, the cost of the class, the cost for additional personnel, and the dates, duration, and locations of each course offered.

# SECTION 15.0

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## 15.0 WARRANTY AND SYSTEM MAINTENANCE

# 15.1 Warranty

Contractor shall warrant that all equipment/services shall conform to the proposed specifications and/or all warranties as stated in the Uniform Commercial Code and be free from all defects in material, workmanship, and title.

The Proposer shall warrant that all equipment and installation conforms to the specifications provided within this RFP, or the manufacturer's published specifications, whichever is most stringent, that it shall be free from defects in materials, functionality and workmanship for a period of at least one (1) year from the date of acceptance. Interim periods between the manufacturer's standard warranty and the date of acceptance will be the Contractor's responsibility.

Proposers shall warrant and guarantee further that the equipment furnished hereunder is of good workmanship and materials and that the same is properly designed, operable and equipped for the proposed use by the Radio Communications Coalition, and is in strict conformity with the detailed Request for Proposal except as agreed upon within the contract documents.

Proposers shall provide a copy of provisions and terms of the proposed warranty in compliance with applicable state and local codes. A description of available warranty options shall be included in the proposal. The Contractor shall be the single point of contact for all warranty claims.

Warranty repairs on all furnished equipment and systems shall be made at no cost for parts of labor for a period of one year from the date of Acceptance. Contractor shall be responsible for any shipping costs incurred to send components to manufacturers for repair or replacement. The Coalition reserves the right to closely monitor and observe warranty repair service.

During the warranty period, the Contractor shall maintain adequate staff and spare parts inventory, both located within the City of Austin, if feasible, to assure prompt warranty service. Response during the warranty period shall be the same as that listed for "Maintenance".

Warranty service shall be provided on the same basis as stated in Section 15.2.1, below. The vendor shall certify that its proposed service facility shall, within the time required herein be able to diagnose any system failure, that repair will be completed at the earliest possible opportunity upon receipt of necessary parts, and any system critical part or sub-

system that is not locally stocked as a spare part will be available on an express basis within twenty-four (24) hours.

Any subcontractor costs for first-year warranty of any system hardware or software component covered under the above warranty requirements shall be included within the basic system proposal price. No maintenance costs shall be paid to any vendor or subcontractor by the Coalition prior to acceptance of the system.

## 15.1.1 Service Under Warranty

If it becomes necessary for the Coalition to contract with another vendor for warranty repairs, due to inability or failure of the Contractor to perform such repairs, the Contractor shall reimburse the Coalition for all invoices for labor, materials required and the shipping/handling costs thereof, to perform such repairs, within 30 days from presentation of such Coalition invoices. This shall only occur after the Contractor has been given written notice, reasonable time and fair opportunity to respond and correct the problem. The cost limitation for such repairs will not exceed the parts and labor replacement price of the repair

#### 15.2 Maintenance

## 15.2.1 System Maintenance, Repair, and Service Facilities

The Contractor shall propose a plan for preventative and remedial maintenance operations, along with all associated costs, for a period of one year following acceptance of the system by the Coalition. Maintenance shall include parts, labor and travel to communications sites or the Coalition facilities to repair fixed equipment. Maintenance and service personnel will be provided access to and accompanied by a Coalition-designated representative at all times while at Coalition-owned tower sites. Mobiles and portables will be delivered to the local service facility, which will preferably be located within the City of Austin.

Each Proposer shall state in its system proposal the name, location and capabilities of any service facilities which could provide any or all of the installation, service and maintenance, both initial and continuing. Proposers shall also include a description of these service facilities, the size and qualifications of its staff, the number of years in business and a list of customers (with names and telephone numbers) who operate systems of similar size and complexity for whom installation and maintenance services are performed. This information is required to demonstrate to the Coalition that

local service facilities are capable of installing, optimizing and maintaining the proposed system.

Proposers shall describe the ongoing level of factory engineering and service support that will be available to the local service facility during the installation and maintenance of the system.

The factory organization that provides such support shall be described in the proposal. Proposers shall also indicate the response time of factory support should it be required by the local service facility. The factory support referenced here will be provided directly to the local service facility for assistance in fulfilling the terms of the installation and maintenance agreements; it shall be provided at no additional cost to the Coalition.

## 15.2.2 System Availability

The importance of a well-defined maintenance program for this system cannot be overstated. Successful system operation depends on consistent, comprehensive routine maintenance backed up by expedient remedial action in response to fixed equipment failures. Proposers shall define a preventative maintenance program that assures, to the extent possible, failure free operation for a period of not less than fifteen (15) years, barring sabotage or natural disasters.

The Coalition also understands that 100% failure-free operation cannot be afforded by most government agencies, due to the expense involved in achieving multiple levels of redundancy and maintaining full-time repair crews at all sites.

Therefore, the Coalition expects that the utmost care and attention will be given to maximizing the system network availability, despite the failure of individual components. In addition to carefully describing your proposed system design's incorporated redundancy and fallback scenarios, your proposal shall include a recommended maintenance schedule to minimize likelihood that your system will revert to any of the fallback modes. No single point of failure may be allowed to completely isolate a user from voice communications with the dispatch center during the life of this system.

## 15.2.3 Service Response

Service response on the system shall be provided as follows:

- Trunked system infrastructure including but not limited to site controller and remote site controllers, if proposed, base repeaters, antenna systems, control stations and communications center equipment, satellite receiving equipment and simulcast optimization equipment, shall be provided service twenty-four hours per day, seven days a week. Response to a major system failure, as defined in the Glossary, shall be made within two (2) hours of notification by the Coalition. Response to minor system failures, as defined in the Glossary, shall be made within four (4) hours. Response is defined as having a factory certified technician on-site at the Coalition's facility where the failure occurred.
- Failure to respond within two (2) hours to a major failure shall result in a deduction of 1 week's maintenance contract fees for each 30-minute period or fraction thereof beyond the two (2) hour point. Failure to respond within four (4) hours to a minor system failure will result in a deduction of one day's maintenance fees from the next month's maintenance payments. These fees shall be deducted from the Coalition's annual maintenance contract. This clause shall be invoked at the sole discretion of the Coalition.
- Mobile and portable equipment shall be serviced in the Proposer's service facility during normal working hours, Monday through Friday. The rate per hour for mobile and portable repair outside of normal business hours must be provided. Repairs shall be completed within three (3) business days.
- Failure to complete repairs within three (3) business days from delivery of the radio to the service facility shall result in repairs being made free of charge. If repairs take more than five (5) business days, \$100/day will be assessed for each day or fraction thereof that the repair is late.
- A sufficient supply of spare parts shall be maintained to allow immediate restoration of operation of the system infrastructure. In the event that these parts are consumed, replacement stock shall be available via emergency request and air freight within twenty four hours of the equipment failure.
- Failure to ship essential parts within 24 hours shall result in a penalty of \$2500 per day for major outages, and \$500 per day for minor

outages, until the system is restored. Penalty fees will be assessed against the maintenance contract payments.

- Proposers shall certify that replacement parts shall be available for a minimum period of ten (10) years following the date of final acceptance of the system by the Coalition or ten (10) years from the date of purchase of any additional equipment. The location of the parts depot that stocks parts for the system shall be specified in the proposal.
- Should replacement parts be unavailable within ten (10) years from acceptance, such that the radio system components cannot be repaired, the vendor shall replace that item with a current year, equivalent model of the same item, with the same features and capabilities, at the last contract price of the component. If the current year item is not compatible with a portion of the system, that portion of the system or subsystem will be replaced. These replacements shall be made at no charge to the Coalition.
- If equipment is proposed which contains microprocessors, large scale integrated circuits (LSI) or very large scale integrated circuits (VLSI) devices which cannot be field diagnosed and repaired, or which require special instrumentation or devices to repair, the Proposer shall specify how such assemblies will be repaired at a central facility. The guaranteed turn around time for return of an exchange or repaired circuit card or other assembly shall be three (3) days or less. Equipment will be packed, shipped, received, and checked by the vendor. The vendor shall pay all shipping costs.
- Failure to return an exchange or repaired unit within three (3) days shall result in the repairs being made free of charge. If repairs take more than five days, then \$100/day will be deducted from the next month's maintenance contract.
- Proposals shall recommend a list of essential spare parts to be maintained by the Coalition to assure rapid restoration of systems operations in the event of component failure. In addition to parts, Proposals shall include a list of recommended test equipment required to maintain the proposed system. Automated test equipment is preferred for mobile/portable equipment. An itemized price list shall be provided for both the recommended parts inventory and the recommended test equipment.
- Stocking of spare parts shall remain the responsibility of the local maintenance provider, who will need parts on hand to avoid any of the above penalties.

- Maintenance shall include keeping all system and equipment software up to date. At the end of the first year of warranty/ maintenance service, all software shall be of the latest version and release that applies to the equipment provided.
- Seven complete sets of programming software, cables, and required interface devices shall be provided for each model of software programmable equipment included in the system. Provide a complete list, including model number and price, for each piece of software and equipment required to program the new equipment.

Any penalties incurred during the warranty period will be based on the rates for the first year of maintenance following the warranty period, and will be deducted from the 1st year of maintenance, or billed to the Contractor if no maintenance agreement is purchased.

Vendor shall specify the methods for maintaining the 800 MHz trunked system to include hardware, operating system and applications software. Such methodology shall define any user responsibilities necessary for total system operation. Performance of any such defined user responsibility shall not be required to qualify for or maintain express or implied warranties or performance guarantees specified within the proposal.

### 15.2.4 Maintenance Manuals

- Complete set of maintenance and operations manuals shall be provided to the Coalition for each category of equipment purchased in association with this project.
- A systems manual which thoroughly describes the overall system configuration and operating modes shall also be provided, showing the system layout and architecture and describing the function of each major system component.
- Manuals for OEM hardware shall be provided for each component of the system by the manufacturer, showing the system layout and architecture and describing the function of each major item.
- Any unique wiring configurations or circuit modifications which are not part of
  the standard equipment documentation provided, shall be included in the ring
  binder. All information as described in the previous paragraph shall be
  included, in addition to the theory and method of operation.

- Vendor shall supply five (5) complete sets of total system maintenance manuals, and one (1) set of maintenance manuals for each site for all equipment at each site.
- Each mobile radio, hand held radio, control station, and dispatch console shall be provided with a user/operator manual. Xerox copies of manuals are not acceptable.

#### 15.2.5 Coalition Provided Maintenance

The City of Austin currently operates its own radio communications shop which includes a staff of at least 12 radio technicians. The City requires that its Radio Shop be certified to provide factory authorized warranty repair service for both parts and labor.

Proposers shall describe the process by which the City's radio shop will become a factory authorized warranty repair station. Your description shall include:

- A description of the skills and level of training required
- A description of courses available to reach this level of training, including length of time and cost
- Courses shall cover <u>all</u> equipment supplied to the Coalition by the successful contractor. Your technician training program should include hands-on instruction on the actual system as it is being installed and optimized.

The technician training courses shall cover, at a minimum, the following topics:

- · overview of the new system
- block diagram and circuit description
- comparison of the old and new systems
- explanation of simulcast and receiver voting
- operational theory of all system components
- principles of digital transmission
- proper operation of system capabilities
- system failure modes
- system diagnostic alarms
- installation and turn on procedures
- · operation of all required test equipment
- alignment and testing procedures
- detailed troubleshooting procedures

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- detailed repair procedures
- detailed maintenance procedures
- · proper record keeping
- detailed review of system documentation structure, numbering system, and documentation control process
- · operating, safety, and traffic continuity procedures
- detailed preventative maintenance procedures

Each of the items above shall be conducted with substantial hands-on involvement, using equipment provided by the successful contractor or third party suppliers as part of this system.

For all off-site training courses, please list the courses available, the cost of the class, the cost for additional personnel, and the dates, duration, and locations of each course offered.

### 15,2.6 Optional Extended Warranty

Each proposer shall include an option to provide extended warranty for up to five years following expiration of the initial system warranty. Terms and conditions shall be the same as those described for the first year of warranty coverage.

The optional maintenance quotation shall be broken down by year, and divided into at least two major categories, with prices quoted for each:

- Infrastructure
- User Equipment

Maintenance proposals shall clearly identify those items covered under the agreement, and clearly delineate items that are not included or conditions that would invalidate the maintenance agreement.

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#### 16.0 PROPOSAL RESPONSE

The purpose of this section is to help the evaluation team quickly and thoroughly understand your proposed system. A 3.5" diskette has been included that contains this section in Word 7.0. You may use the diskette to "insert" your responses as necessary. Provide your response in a printed format. Answer all sections. In addition to the Technical Evaluation Committee, your proposal will be reviewed by personnel from the Coalition Project Team. The use of graphics and graphical presentation materials in your proposal will facilitate a clearer understanding of your proposed system. The Response Section of your proposal shall be bound separately from the remainder of the proposal. You may include additional pages as necessary to make your response complete.

### 16.1 Proposer's Background

Proposer's Name:

devoted to this project.

Company References

your company.

	Location:
	Point of Contact for Proposal
	Name:
	Title:
	Γelephone:
	Fax:
	Do you manufacture the radio equipment in your proposed system?
(	Comments:

contribution each will make on your company's behalf. Include the percent of their time

List and describe five systems of similar scope which were developed and installed by

Location: No. of Repeater Sites: No. of Radio Channels: No. of Radios Supported: Client Contact: Telephone No.: Type of System: Location: No. of Repeater Sites: No. of Radio Channels: No. of Radios Supported: Client Contact: Telephone No.: Type of System: Location: No. of Repeater Sites: No. of Radio Channels: No. of Radios Supported: Client Contact: Telephone No.: Type of System: Location: No. of Repeater Sites: No. of Radio Channels: No. of Radios Supported: Client Contact:

Telephone No.:

1. Type of System:

5.	Type of System:	
	Location:	
	No. of Repeater Sites:	
	No. of Radio Channels:	
	No. of Radios Supported:	
	Client Contact:	
	Telephone No.:	
Propos	ed Project Manager	
	one:	
No. of	Years with your Company:	
Percent of Project Manager's time dedicated to this project:		
Provide	a brief description of your Project Manager's background including education	
Provide and rela	a brief description of your Project Manager's background including education ated experience in managing a project of this size.  ee client references for your proposed Project Manager.	
Provide and rela	a brief description of your Project Manager's background including education ated experience in managing a project of this size.  ee client references for your proposed Project Manager.  Name:	
Provide and rela	a brief description of your Project Manager's background including education ated experience in managing a project of this size.  ee client references for your proposed Project Manager.	
Provide and rela	a brief description of your Project Manager's background including education sted experience in managing a project of this size.  ee client references for your proposed Project Manager.  Name:  Representing:	
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Provide and related List thrule.	a brief description of your Project Manager's background including education ated experience in managing a project of this size.  ee client references for your proposed Project Manager.  Name:  Representing:  Name:  Representing:  Telephone No.:  Telephone No.:	

#### 16.2 Financial Information

Please provide the following information about your company:

- A copy of your company's most recent audited financial statement
- · A copy of your firm's 10k form
- Two bank references

1.	Bank:	
	Location:	
	Contact:	
	Telephone:	
2.	. Bank:	
	Location:	
	Contact:	
	Telephone:	

Complete and attach the following forms from Section 2.36:

- Insurance Requirement Affidavit
- Proposal Affidavit

## 16.3 Exceptions to this Specification

Note: The response "agreed as specified" is adequate unless exceptions are taken.

Section 1.0	General Information
Section 2.0	Response Procedures
Section 3.0	Evaluation, Selection, and Award
Section 4.0	Trunked Radio System Description
Section 5.0	Dispatch Facilities
Section 6.0	Communication Sites
Section 7.0	Ancillary Communications Equipment
Section 8.0	Microwave Radio System

Section 9.0	Installation and Documentation
Section 10.0	Warranty and System Maintenance
Section 11.0	Acceptance Testing
Section 12.0	Radio Equipment Specifications
Section 13.0	Training
Section 14.0	Implementation & Payment Schedule
Section 15.0	User Agency Equipment Requirements
Section 16.0	Proposal Response
Section 17.0	Pricing Information
Section 18.0	Exhibits
Section 19.0	Glossary of Terminology
Section 20.0	Minority and Women Owned Business Enterprise (MBE/WBE) Procurement Program Package

### 16.4 Maintenance Support

Provide a complete description of your maintenance program. Provide a complete description of the maintenance provider proposed. Include the following items in your discussion.

- Name of Maintenance
- Address
- Telephone
- Contact
- Description of Facilities
- Service Center Capabilities
- Number of Vehicle Bays for Mobile Installs/Repairs
- Description of Test Equipment Maintained by the Facility
- Description of Any Continuing Education Program in Effect
- Technicians Dispatched From
- . No. of Technicians Trained on the Proposed System in the Area
- · No. of Technicians Trained to do Mobile Installs
- Staff Qualifications

- Customer References (names and telephone numbers) with similar systems in the area for whom installation and maintenance services are performed
- Location of Local Spare Parts Inventory
- General Description of the Local Parts Inventory
- · Location of Factory Parts Depot for Parts for the System
- Guaranteed Response Times
  - Major Outage
  - Minor Outage
- Hourly Rate for Rate Work Done Outside of the Contracted Hours
  - Normal Business Hours
  - Nights, Weekends, Holidays
- Please describe your repair procedures for parts or equipment that can not be repaired at or by the proposed local facility, and must be repaired by a centralized repair facility.
- State your guaranteed return time for items sent to such a centralized facility.
- State your guaranteed return time for mobile and portable radio repairs.
- Describe the ongoing level of factory engineering and service support that will be available
  to the local service facility during the installation and maintenance of the system.
- · Describe the escalation procedures for resolving system outages or problems
- · Please describe the factory organization that provides such support.
- Please indicate the response time on site of factory support should it be required by the local service facility.
- Please provide an itemized price list of essential spare parts to be maintained to assure rapid restoration of the system in the event of component failure.
- Please provide an itemized price list of test equipment to be used to maintain your proposed system.

#### 16.5 Subcontractors

Identify any and all subcontractors performing installation of any equipment or subsystems.

Outline the subcontractors' experience and qualifications to perform the associated tasks.

#### 16.6 Project Schedule

Describe your company's ability and willingness to comply with the Coalition's project schedule. If any items in your proposal are currently unavailable you must fully describe how the product availability will affect your ability to complete the project on schedule. Include your proposed schedule here. A Gantt Chart with milestones and a Work Breakdown Structure shall be provided.

Please provide a narrative to accompany your timeline. Include in your discussion key milestones and deliverables that must be met by the Coalition in order to stay on schedule. Please discuss your cutover plans in this section.

Please discuss your proposed method for managing the integration of the various Coalition agencies with the system. Please describe who will have primary responsibility for their successful implementation, including programming and installation.

Please describe your proposed method of installing the mobile radios for the various Coalition agencies. In your discussion, please describe the number of units that could be installed per day, where they would be installed, who would perform the work, where extra labor would come from if necessary, who would supervise and what your quality control and inventory control processes would be.

# 16.7 Proposed System Architecture

Thoroughly describe the type of system proposed for both approaches, simulcast and non-simulcast. Your discussion must provide a system overview (including block diagrams) for each approach followed by a breakdown of the equipment and facilities proposed for each site. At a minimum, the following items must be addressed:

- Type of System (Trunked/Conventional, Simulcast, etc.)
- No. and Location of all Repeater Sites including backup sites
- Maximum number of remote sites per simulcast controller or simulcast cell
- Maximum number of channels per simulcast controller or simulcast cell
- Maximum number of individual sites, subsystems, and simulcast cells per MNC

- General overview of system operation
- Listing and Description of all Equipment proposed for each site
- No. of RF Channels per Site
- Thoroughly describe the channel expansion process, per site, per channel. Provide additional costs per channel, and describe any savings associated with adding larger numbers of channels at one time.
- Thoroughly describe the proposed method of Linking Sites to Central Dispatch Facilities (including fiber optics, leased T-1 facilities, Sonet microwave, or digital microwave)
- Guaranteed Channel Access Time, from Push to Talk to Receiver Open and Ready to Receive. Include a transaction timing diagram depicting the worst case scenario within your proposed system design with your discussion. Include a separate timing diagram for the analog mode, digital mode, and digitally encrypted mode.
- Thoroughly describe your proposed encryption scheme.
- Itemize the cost of encryption on a per channel basis.
- All potential single points of failure, however unlikely, must be identified.
- All parts and components proprietary to the vendor must be identified.
- Identify dealers licensed to distribute the Proposer's subscriber units.
- Identify manufacturers and dealers of subscriber radios compatible with the proposed system.
- Propagation Maps Displaying Coverage and TDI analysis
  - Describe the propagation model used to prepare your coverage maps
  - Include a data sheet for each plot included in your proposal, including all gains, losses, and other factors
- Method of changing from site to site as a unit roams the coverage area
- Failure or fallback modes of operation when system failures occur, including, but not necessarily limited to:
  - Master/Prime site controller
  - Site Controllers
  - Simulcast synchronization, audio delay, and amplitude control
  - Microwave/fiber optic links between sites
  - Console switch

- Master audio switch/Network Controller
- AC power failures
- · Failure indications at supervisory console
- Manual override process and time to switch to backup controllers and/or systems
- Migration of the system to narrow-band combined analog/digital operation. Your discussion must include a description of which components will have to be upgraded or replaced including but not limited to:
  - Master/Prime site controller
  - Master audio switch/Network Controller
  - Mobile radios
  - Portable radios
  - Control stations
  - Microwave system
  - Fiber Optics systems
  - Repeaters
  - Site controllers (hardware and software)
  - Dispatch consoles (hardware and software)
  - System/network manager system
- Impact of repeater site separation as proposed on encrypted voice operation and narrowband analog/digital operation.
- Method of providing radio coverage in required buildings.
- Method of providing interoperability with the VHF and UHF channels of interest to the participating agencies.
- Method of providing Station and Personnel Alerting. Describe the operation of the proposed methodology and include the following:
  - Manufacturer, make and model of proposed encoders
  - Quantity and locations of proposed encoders
  - Method of alerting individual stations and groups of stations
  - Method of alerting specific individuals and groups of individuals
  - Functional capabilities

- Maximum number of stations and/or personnel that can be alerted as configured

### 16.8 Proposed Mobile Radios

Describe each of your proposed mobile radios. Include the items listed below in your discussion:

- Manufacturer
- Make and Model Numbers
- Analog/Digital
- Wide-band/Narrow-band
- RF Power Output
- No. of Systems
- No. of modes
- Encryption capability, OTAR, code keys
  - Talk-around
- Priority Scan
- Dynamic Regrouping
- Dual Mode Operation (Trunked/Conventional)
- Call Alert (Paging via Signaling Channel)
- Individual Call
- Indicate if Individual Call list is separate from Call Alert list
- Indicate maximum size of each
- Display Type
- Emergency Button
- Unit ID
  - Indicate ability to display alias of calling party
  - Indicate maximum number of aliases that can be programmed
- System capability failure indications

- Migration to Digital Modulation (FDMA or FTDMA) (Specifically identify whether the proposed radios can be upgraded or will have to be replaced to support narrow-band digital modulation.)
- Provide a specification compliance matrix for each proposed mobile

### 16.9 Proposed Handheld Radios

Describe each of your proposed handheld radios. Include the items listed below for each proposed model in your discussion:

- Manufacturer
- Make and Model No.
- Analog/Digital
- Wide-band/Narrow-band
- RF Power Output
- No. of Systems
- No. of Modes
- · Encryption Capability, OTAR, Code Keys
- Talk-around
- Priority Scan
- Dynamic Regrouping
- Dual Mode Operation
- Call Alert (Paging via Signaling Channel)
- Individual Call
  - Indicate if Individual Call list is separate from Call Alert list
  - Indicate maximum size of each
- Display Type
- Rechargeable battery (Capacity, Recharge Rate, etc.)
- Carrying Device
- Emergency Button

- · Unit I.D.
  - Indicate ability to display alias of calling party
  - Indicate maximum number of aliases that can be programmed
- System capability failure indications
- Options (Speaker Mic, Vehicular Charger with Mic, Antenna, Headsets, etc.)
- Include a discussion of headsets available for use by Bicycle Patrols, Rescue Teams, HazMat Teams, SWAT, and Dignitary Protections Details.
- Migration to Digital Modulation (FDMA or FTDMA) (Specifically identify whether the proposed radio can be upgraded or will have to be replaced to support narrow-band digital modulation.)
- Provide a specification compliance matrix for each proposed handheld radio

### 16.10 Proposed Control Stations

Describe your proposed control stations. Include the items listed below in your discussion:

- Manufacturer
- Make and Model No.
- Analog/Digital
- Wide-band/Narrow-band
- RF Power Output
- No. of Systems
- No. of Groups, Subfleets, and Conventional Channels
- Encryption, OTAR, Code Keys
- Talk-around
- Priority Scan
- Dynamic Regrouping

- Dual Mode Operation
- Call Alert (Paging via Signaling Channel)
- Individual Call
  - Indicate if Individual Call list is separate from Call Alert list
  - Indicate maximum size of each
- Display Type
- Desk Mic
- Backup Power System (4 Hours)
- Emergency Button
- Unit ID
  - Indicate ability to display alias of calling party
  - Indicate maximum number of aliases that can be programmed
- · System capability failure indications
- Migration to Digital Modulation (FDMA or FTDMA) (Specifically identify whether the proposed radio can be upgraded or will have to be replaced to support digital modulation.)
- Provide a specification compliance matrix for each proposed control station

## 16.11 Proposed Control Station 4-Hour Rechargeable Power System

- Type: AC/DC
- Manufacturer
- Operating Capacity (Time)
- · Recharge Time
- Required Maintenance

### 16.12 Proposed Equipment Shelters

Describe the proposed equipment shelters. Include the following items in your discussion:

- · Quantity and location of each Proposed Shelter
- Manufacturer
- Size
- Type of Construction and Finish
- Slab and Fence
- Climate Control
- Bulkhead Panel (Polyphaser)
- Grounding System
- Ice Shield and Waveguide Bridge
- Lighting and Electrical System
- Surge Suppression (AC, Coaxial, Control Ckts.)
- Locks

Include scale drawings of the floor plan, rack layouts, and exterior elevations.

#### 16.13 Proposed Power Systems

#### 16.13.1 Uninterruptible Power Supply (UPS)

Describe your proposed UPS's. Include the following items in your discussion:

- Quantity proposed and location of each UPS
- Manufacturer, Make and Model #
- Rated output
- Operating time at full load
- Alarm outputs provided and monitored

### 16.13.2 DC Power Systems

Describe your proposed DC Power System. Include the following in your discussion:

- Quantity proposed and location of each piece of equipment
- Equipment Manufacturer, Make and Model #
- Associated features
- Rack face drawing of power system layout

#### 16.13.3 AC Power Generators

Describe your proposed AC Power Generators. Include the following items in your discussion:

- Quantity Proposed and location of each generator
- Manufacturer
- Model
- Type of Fuel
- KW Rating
- Fuel Tank Size in Gallons
- Run Time per Fueling @ Full Load
- Type of Fuel Tank
- Associated Features & Transfer interfaces

### 16.14 Proposed Microwave System

Describe the microwave system configuration and equipment you are proposing. Include the following items in your discussion:

- Configuration of your proposed system (site locations, redundant operation)
- Manufacturer
- Model Radios
- Type (Digital/Sonet)
- Baseband Capacity
- Equipped Capacity (MUX)
- Orderwire
- BER Performance
- Calculated Fade Margin per Hop, predicted faded Bit Error Rate, and Fade Margin Calculation Worksheet, Path Profiles
- · Battery Plant Type, Capacity in Hours, Recharge Time
- Alarm System
- Multiplexor manufacturer, make and model #
- Antenna manufacturer, make and model #

# 16.15 Proposed Main and Backup Dispatch Consoles

Describe the proposed main dispatch consoles proposed for each agency. Include the following items in your discussion:

- Manufacturer
- Make and Model
- Central Switch Capacity (No. of Operator positions supported)
- · No. and type of circuits required for remote operator positions
- · No. of talkgroups and conventional channels supported (as proposed)
- No. of unit ID's and aliases supported per switch and/or operator position
- Functional Capabilities

- Mount
- Displays
- Type of Signaling
- Power System (via control station or AC line)
- Capability of changing talk groups or control station

### 16.19 Proposed Trunked Site Antenna Systems (800/900 MHz)

Describe your proposed repeater antenna systems. Include the following items in your discussion:

- Combiners (make, model, number of channels)
- Multicoupler (make, model, number of channels)
- Tower Top Amp
- Transmit Antenna (make, model, gain, height, and orientation)
- Receive Antenna (make, model, gain, height, and orientation)
- Transmission Line Used
- Surge suppression devices proposed

## 16.20 Proposed System Manager/Information Management System

Describe your proposed system/network management system. Include the following in your description:

- Computer Platform Provided (main and remotes):
- Number of Terminals Proposed:
- Number of Terminals Supported:
- Dial-up Capability:
- Functional Capabilities:
- Please provide complete and thorough descriptions of the operation of each of the following functions:

- Dynamic talkgroup reconfiguration:
  - # of pre-programmed plans available
  - Time to regroup each unit
  - Method of verifying successful regroup
  - Radio indications following a regroup
- Selective Inhibit/Uninhibit
  - Method of disabling a unit
  - How long the system will "search" for a targeted unit
  - Unit's capabilities while disabled
  - Unit indications while disabled
  - Steps to re-enable a disabled unit
- Activity Reporting and Archiving
  - Information available
  - Sample reports
- Report Generation Printing
  - Manufacturer, make and model at proposed printers
- Database Maintenance
  - Parameters controlled
  - Number of separate databases that must be maintained for user authentication, user ID aliasing, alarm ID aliasing, etc.
- Controller Updating
  - Remote capabilities
  - Password protection/# of access levels
- · System Diagnostic and Alarm Reporting
- Graphical User Interface

# 16.20.1 Programming Software

Describe your programming software packages. Include the following in your discussion:

- · Model number and price for each piece of software and equipment.
- Remote programming capabilities of your system, including:
  - Backbone/Network equipment
  - Repeater site equipment
  - Dispatch Center equipment
  - Subscriber equipment
- Indicate which items/features can be programmed over the air, through the backbone distribution network, through dial up lines, through dedicated leased lines, or only by being on location with the equipment.

#### 16.20.2 Alarm System

Describe your proposed alarm system. Include the following in your discussion:

- · Manufacturer, make and model of all equipment
- Quantity proposed and proposed location of all equipment
- · Functional capabilities
- Diagnostics displayed
- Alarm conditions displayed
- · Sensors provided and monitored
  - Radio Equipment
  - Dispatch Center Equipment
  - Power Systems
  - Microwave Systems
  - Sites
- Proposed communications medium for your alarm system

# 16.21 Proposed Fleet/Subfleet Mapping Plan

Describe the fleet mapping capabilities of the proposed system, including conventional operation. Identify fleet or subfleet boundaries or limitations in size.

# 16.22 Proposed Training Program

Describe your proposed training program. Include the following items in your discussion:

### Dispatch Consoles

- No. of Classes
- Duration Each
- Class Size
- Media Used
- Proposed No. of Instructor Hours
- Proposed Cost

### Field User Training

- No. of Classes
- Duration Each
- Class Size
- Location
- Media Used

Proposed No. of Instructor Hours

### System Manager Training

- No. of Classes
- Duration Each
- Class Size
- Location
- Media Used
- Proposed No. of Instructor Hours
- Proposed Cost

### Technician Training (Full System Maintenance)

• Category 1	Mobiles, portables, control stations, and ancillary equipment
Category 2	Console systems, Systems Manager system

Category 3 -	System infrastructure, repeater sites, microwave, site controllers, Master Network controllers, simulcast control, receiver voting, etc.
--------------	--

For each category, provide:

- No of classes recommended
- Recommended class size
- Duration
- Location
- Media used
- Cost

Please provide client references who have been trained by your proposed instructors.

## 16.23 Acceptance Testing Procedures

Please provide complete test scripts here, as requested in Section 11.3.

# 16.24 Proposed Radio Towers

Please provide a complete description of your proposed radio towers, including the following items in your discussion:

- Number of towers proposed
- Proposed location of each tower
- Make, model, type, and tower height of each tower
- Tower lighting
- Grounding
- · Site construction, including fencing, landscaping, access, etc.
- Map of Austin-Travis County showing the location of all proposed tower sites

Include site and tower drawings for each proposed tower site.

### 16.25 Transportable Repeater Systems

Please provide a complete description of your proposed Transportable Repeater Systems, including the following items in your discussion:

- Mobile Repeater
  - configuration
  - make, model and type of equipment included
  - method of communicating with primary system
  - power supply/requirements
  - package ERP/ERS
- Transportable Repeater Site
  - make, model and type of all equipment
  - overview of package configuration
  - antenna height with system deployed
  - ERP/ERS when fully deployed
  - Generator run time with on-board fuel

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#### 17.0 PRICING CONSIDERATIONS

The purpose of this section is to help the evaluation team quickly and thoroughly understand your proposed system. A 3.5" diskette has been included that contains this section in Excel97 format. Please use the diskette to "insert" your responses as necessary. Provide your response in both a printed and electronic format in the form provided. (If the file will not fit on a single disk, it may returned in a compressed format using PKZIP or a similar program OR it may returned on a 100mb disk compatible with an IOMEGE ZIP100 drive).

In addition to the Technical Evaluation Committee, your cost proposal will be reviewed separately by personnel from the Coalition Project Team. The Pricing Section of your proposal shall be returned separately from the remainder of the proposal. You may include additional pages as necessary to make your response complete. However, any such pages reflecting pricing must be in the same format as that provided on the enclosed disk.

## 17.1 General Pricing Information

The pricing portion of this RFP is developed as a guide for Proposers to complete. Round all costs to the nearest dollar. All major parts of this Section must be completed in the format provided in this section and returned in both a printed and electronic format. If additional space is needed, similar type formats should be utilized. For additional tower sites, please make as many copies of the Site Pricing sheet as you require. As this is a turnkey system, any pricing omission, whether it is specifically delineated below or not, that is normally considered part of the system, will be provided for by the Contractor at no additional cost to the Coalition.

#### 17.1.1 Future Purchase Considerations

It is the intent of the Coalition to operate this new radio communication system for, minimally, the next ten years. As the equipment purchased may only be available from one vendor, it is important that the Coalition receive consideration with regard to future pricing.

Other municipalities and governmental entities, other than those noted in Section 1.0, in the

Greater Austin-Travis County area and surrounding jurisdictions may also wish to participate in this project under the same terms and conditions contained in this Request for Proposal. Each entity wishing to so participate ("piggy back") must have prior authorization from the Coalition and the successful Proposer. In the event that such participation is authorized, all purchase orders will be issued directly from, and shipped directly to, the entity requiring such services. Neither the Coalition nor the City shall be held responsible for any orders placed, deliveries/installation made, or payment for equipment/services ordered by these entities. Each proposer is required to state in their Proposal their willingness to allow other governmental entities to so "piggy back" off the resultant contract.

#### 17.1.2 Immediate Future Discounts

For all purchases within two (2) years after the system acceptance date, the discount percentage received by the Coalition will be greater than or equal to the discount percentages derived from the list unit equipment costs and proposed RFP unit costs as stated herein. The list unit equipment price will be determined by the manufacturer's published equipment list price as delivered to their retail outlets.

### 17.1.3 Current Equipment Discounts

Provide the current discount percentage from list price proposed for the following categories of equipment

•	Repeater Site Equipment	%
•	Mobile	%
•	Portable Radios	%
•	Console Equipment	%
•	Control Station Equipment	%
•	Accessories	%
•	Spare Parts	%

#### 17.1.4 Purchase Price Discount Years 3-7

For years three (3) through seven (7) after the system acceptance date, the Coalition discount from the manufacturer's published equipment list price, as delivered to their retail outlets, shall be at least as follows:

•	Repeater Site Equipment	%
	Mobile	%
•	Portable Radios	
•	Console Equipment	%
	Control Station Equipment	0/₀
	Accessories	%
	Spare Parts	0/₀

### 17.1.5 Software Upgrades

Provide prices for software upgrade/maintenance for years 2 through 5. This service shall include software, parts and technical assistance to install, test and commission software improvements applicable to the proposed system configuration.

Year	Upgrade	Maintenance
2		
3		
4		
5		

# 17.2 Lease/Purchase Option

Should the Coalition decide to finance all or part of the radio system described herein, the interest rate charged by the Proposer will affect the life cycle cost of the system. The following table representing a set lease/purchase term with a \$1.00 buyout at the end of that term must be completed:

OPTION TERMS	ANNUAL FACTOR	MONTHLY FACTOR
Five (5) Years		
Seven (7) Years		
Ten (10) Years		

### 17.3 Existing-System Salvage Value

Equipment from the Coalition is available for salvage. A list of this equipment shall be provided at the Pre-proposal Conference. Proposers shall provide an option for a trade-in credit for the items and quantities listed. All listed equipment is in good operating condition.

CREDIT	\$

### 17.4 Unit Pricing

Provide unit pricing for the following categories of equipment. Unit pricing information will be used by the agencies to make minor changes to equipment quantities if needed.

٠	800/900 MHz Simulcast Trunked Repeater	\$
٠	800/900 MHz Trunked Repeater	
•	Single Channel 800/900 MHz Conventional Mobile Repeater	\$
•	Single Channel Trunked Mobile Repeater	\$
٠	Suitcase Trunked System	\$
•	325' Self-Supporting Tower w/ Foundation & Installation	\$
•	Equipment Shelter w/ Foundation	\$
•	Repeater Site AC Generator	\$
•	Receiver Voting Comparators	\$
•	Microwave Antenna System	\$
•	Continuous Backup Power System	\$
•	Power System and Batter Backup	\$
	Transmit Antenna System	\$
	Receive Antenna System	\$

•	NPSPAC Mutual Aid Channel	\$
•	SCADA and Alarm System	\$
•	Self-Contained Control Station w/ Desk Mic, 9 dB Yagi Antenna, 75' 1/2" LDF4-50 Coax w/Connectors	\$
•	Control Station w/ Desk Mic, 9 dB Yagi Antenna, 75' 1/2" LDF4-50 Coax w/Connectors & External Power Supply	\$
•	4 Hour Rechargeable Power System for Control Station	\$
•	Mobile Radio, Trunk Mount, Analog, Low-Tier	\$
•	Mobile Radio, Trunk Mount, Analog, Mid-Tier	\$
•	Mobile Radio, Trunk Mount, Analog, High Tier	\$
•	Mobile Radio, Trunk Mount, Digital, Low Tier	\$
•	Mobile Radio, Trunk Mount, Digital, Mid-Tier	\$
•	Mobile Radio, Trunk Mount, Digital, High Tier	\$
•	Mobile Radio, Dash Mount, Analog, Low Tier	\$
•	Mobile Radio, Dash Mount, Analog, Mid-Tier	\$
•	Mobile Radio, Dash Mount, Analog, High Tier	\$
•	Mobile Radio, Dash Mount, Digital, Low-Tier	\$
•	Mobile Radio, Dash Mount, Digital, Mid-Tier	\$
•	Mobile Radio, Dash Mount, Digital, High-Tier	\$
•	New Mobile Radio Install w/ Old Radio Removal	\$
•	New Mobile Radio w/o Old Radio Removal	\$
•	Dual Control Head Option for Mobile Radio	\$
•	Outside External Speaker for Mobile Radio	\$
•	Lights, Siren, & PA Control	\$
•	Portable Radio, Analog, Low-Tier	\$
•	Portable Radio, Analog, Mid-Tier	\$
•	Portable Radio, Analog, High-Tier	\$

•	Portable Radio, Digital, Low-Tier	\$
	Portable Radio, Digital, Mid-Tier	\$
•	Portable Radio, Digital, High-Tier	\$
٠	Voice Encryption Option	\$
•	Belt Clip Option for Portable Radio	\$
•	Leather Carrying Case for Portable Radio	\$
•	Spare Portable Radio Battery (as proposed)	\$
•	Individual Charger (1 hour)	\$
•	Bank Charger for Portable Batteries (1 hour)	\$
•	6 GHz Hot Standby Digital Microwave Hop	\$
•	Sonet Microwave Hop	\$
	3 dB Mobile Antenna	\$
•	Headset with Boom Mic	\$
•	Speaker/Microphone Without Antenna (Coiled Cord)	\$
٠	Speaker/Microphone w/ Antenna	\$
•	Earphone for Portable (No Microphone)	\$
٠	Tactical Headset	\$
•	Single-Ear headset/microphone	\$
٠	Headset microphone for bicycle helmet	\$
•	Headset microphone for rescue helmet	\$
•	Headset microphone for Haz-Mat helmet	\$
•	Headset microphone for Motorcycle helmet	\$
•	Bone Conduction microphone w/ earpiece	\$
•	Throat microphone w/ earpiece	\$
	Hands-Free (voice activated) operation	\$
	3-way "Dignitary Protection" headset w/ earpiece & remote mic.	\$

	Vehicular Charger for Portable (specify models)	\$
•	Vehicular Charger/Converter w/Microphone, Speaker	
	& External 3 dB Antenna	\$
	Desktop Remote Control Unit for Control Station	\$
•	Desktop Multi-Channel Console	\$
	CRT Based Console Operator Position	
	• 21" monitor w/ touchscreen capability	\$
	<ul> <li>19" monitor w/ touchscreen capability</li> </ul>	\$
	• 17" monitor	\$
	• 15" monitor	\$
	Portable Radio Battery Analyzer (specify make/model)	\$
	Time Synchronization clock	\$
•	System Management Terminal	\$
	System Alarm Terminal	\$
•	Hardwire line transmitter	\$
	Digital Logging Recorder-tape media	\$
	Accessory (describe)	\$\$
	Accessory (describe)	\$\$
	Accessory (describe)	\$
	Accessory (describe)	\$
	Accessory (describe)	\$\$
	Accessory (describe)	\$
	Accessory (describe)	\$

Options (describe)	\$
Options (describe)	\$
Options (describe)	\$
Options (describe)	\$
Options (describe)	\$\$
Options (describe)	\$
Options (describe)	\$\$
Digital Logging Recorder-optical disk media	\$
Accessory (describe)	\$
Accessory (describe)	\$
Accessory (describe)	\$\$
Accessory (describe)	\$
Accessory (describe)	\$\$
Accessory (describe)	\$
Options (describe)	\$
Options (describe)	\$
Options (describe)	\$\$
Options (describe)	\$
Options (describe)	\$\$
Options (describe)	\$\$
Options (describe)	\$
Digital Instant Recall Recorder	\$

#### 17.5 Other Unit Pricing

Please provide information on other compatible trunked radio products you offer that may be of interest to the Coalition and Travis County Radio Communications Coalition agencies. Provide complete descriptions, including at least the following:

- Manufacturer
- Make
- Model
- Features
- Accessories
- Proposed Unit Cost
- Monthly Maintenance Cost Per Unit

Include complete product brochures for these products and accessories.

Please use this section to list and describe compatible radios made by other manufacturers that may be used with your proposed system.

### 17.6 Unit Maintenance Pricing

Provide monthly unit pricing for maintenance of the following categories of equipment. Unit pricing information will be used by the agencies to make budget estimates and minor changes to equipment quantities if needed.

•	800/900 MHz Simulcast Trunked Repeater	\$
•	800/900 MHz Trunked Repeater	
•	Single Channel 800/900 MHz Conventional Mobile Repeater	\$
	Single Channel Trunked Mobile Repeater	\$
•	Suitcase Trunked System	\$
•	Equipment Shelter w/ Foundation	\$
	Repeater Site AC Generator	\$
	Receiver Voting Comparators	\$
	Microwave Antenna System	\$
	Continuous Backup Power System	\$

•	Power System and Batter Backup	\$
	Transmit Antenna System	\$
•	Receive Antenna System	\$
•	NPSPAC Mutual Aid Channel	\$
•	SCADA and Alarm System	\$
•	Self-Contained Control Station w/ Desk Mic, 9 dB Yagi Antenna, 75' 1/2" LDF4-50 Coax w/Connectors	\$
•	Control Station w/ Desk Mic, 9 dB Yagi Antenna, 75' ½" LDF4-50 Coax w/Connectors & External Power Supply	\$
•	4 Hour Rechargeable Power System for Control Station	\$
•	Mobile Radio, Trunk Mount, Analog, Low-Tier	\$
	Mobile Radio, Trunk Mount, Analog, Mid-Tier	\$
	Mobile Radio, Trunk Mount, Analog, High Tier	\$
	Mobile Radio, Trunk Mount, Digital, Low Tier	\$
	Mobile Radio, Trunk Mount, Digital, Mid-Tier	\$
	Mobile Radio, Trunk Mount, Digital, High Tier	\$
•	Mobile Radio, Dash Mount, Analog, Low Tier	\$
•	Mobile Radio, Dash Mount, Analog, Mid-Tier	\$
•	Mobile Radio, Dash Mount, Analog, High Tier	\$
•	Mobile Radio, Dash Mount, Digital, Low-Tier	\$
•	Mobile Radio, Dash Mount, Digital, Mid-Tier	\$
•	Mobile Radio, Dash Mount, Digital, High-Tier	\$
	New Mobile Radio Install w/ Old Radio Removal	\$
•	New Mobile Radio w/o Old Radio Removal	\$
	Dual Control Head Option for Mobile Radio	\$
•	Outside External Speaker for Mobile Radio	\$
	Lights, Siren, & PA Control	\$

	Portable Radio, Analog, Low-Tier	\$
•	Portable Radio, Analog, Mid-Tier	\$
•	Portable Radio, Analog, High-Tier	\$
	Portable Radio, Digital, Low-Tier	\$
•	Portable Radio, Digital, Mid-Tier	\$
•	Portable Radio, Digital, High-Tier	\$
•	Voice Encryption Option	\$
۰	Belt Clip Option for Portable Radio	\$
	Leather Carrying Case for Portable Radio	\$
•	Spare Portable Radio Battery (as proposed)	\$
•	Individual Charger (1 hour)	\$
•	Bank Charger for Portable Batteries (1 hour)	\$
	6 GHz Hot Standby Microwave Hop	\$
	Sonet Microwave Hop	\$
٠	3 dB Mobile Antenna	\$
	Headset with Boom Mic	\$
•	Speaker/Microphone Without Antenna (Coiled Cord)	\$
	Speaker/Microphone w/ Antenna	\$
•	Earphone for Portable (No Microphone)	\$
	Tactical Headset	\$
•	Single-Ear headset/microphone	\$
	Headset microphone for bicycle helmet	\$
×	Headset microphone for rescue helmet	\$
	Headset microphone for Haz-Mat helmet	\$
	Headset microphone for Motorcycle helmet	\$
	Bone Conduction microphone w/ earniece	S

•	Throat microphone w/ earpiece	\$
•	Hands-Free (voice activated) operation	\$
•	3-way "Dignitary Protection" headset w/ earpiece & remote mic.	\$
•	Vehicular Charger for Portable (specify models)	\$
•	Vehicular Charger/Converter w/Microphone, Speaker	
	& External 3 dB Antenna	\$
•	Desktop Remote Control Unit for Control Station	\$
٠	Desktop Multi-Channel Console	\$
•	CRT Based Console Operator Position	
	• 21" monitor w/ touchscreen capability	\$
	<ul> <li>19" monitor w/ touchscreen capability</li> </ul>	\$
	• 17" monitor	\$
	• 15" monitor	\$
٠	Portable Radio Battery Analyzer (specify make/model)	\$
•	Time Synchronization clock	\$
•	System Management Terminal	\$
•	System Alarm Terminal	\$
٠	Hardwire line transmitter	\$
•	Digital Logging Recorder-tape media	\$
	Accessory (describe)	\$\$
	Accessory (describe)	S

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\$

Options (describe)	\$
Options (describe)	\$\$
Digital Instant Recall Recorder	\$
Console Furniture per position	\$

## 17.7 Warranty - Logging Recorders

Provide annual pricing for 24 x 365 parts and labor warranty for the digital logging recorders per recorder:

YEAR	Tape Media	Optical Disk Media			
2					
3					
4					
5					
6					

## 17.8 Warranty - Instant Recall Recorders

Provide annual pricing for 24 x 365 parts and labor warranty for the digital instant recall recorders per recorder

YEAR	
2	
3	
4	
5	
6	

#### 17.9 Training

Provide Costs for training for each level and type of training.

	On-Site Field User Training	\$
	Train-the-Trainer Field User Training	\$
٠	On-Site Dispatcher Training	\$
	Train-the-Trainer Dispatcher Training	\$
•	Dispatcher Supervisor Training	\$
	System Manager Training	\$
	System Maintenance and Technician Training	
	<ul> <li>Category 1 (Mobiles, Portables, Control Stations,</li> </ul>	
	and ancillary equipment	\$
	<ul> <li>Category 2 (Console Systems, Systems Managers System</li> </ul>	\$
	<ul> <li>Category 3 (System infrastructure, repeater sites, microwave,</li> </ul>	
	site controllers, Master Network controllers, Simulcast control	
	receiver voting, etc.	\$
•	Off-Site Training	\$
	Hourly rate for Supplemental Training	

## 17.10 Pricing Analysis Worksheets

The following pricing worksheets are to be used as a guide to developing a firm price for the Proposed submittal. These worksheets are indicative of the detail required and may be amended or expanded as necessary. Any omission or error in developing the pricing proposal shall be the sole responsibility of the Proposer.

## 17.10.1 End User Equipment

The quantities of end user (subscriber) equipment indicated by the following worksheets are approximated for each department's needs. The Coalition reserves the right to modify the quantity, style and mix of equipment prior to project acceptance.

The Contractor shall not charge the Coalition any restocking fees for product exchanges, upgrades or substitutions provided that the equipment being exchanged and/or returned is new, unused and has not been installed or placed in service

#### 17.11 Pricing Summary

Please provide a pricing summary that includes and identifies each of the following:

- The Master Network Controller/Audio Switch Primary Site
- The Master Network Controller/Audio Switch Redundant Site
- All other infrastructure
- All in-building solutions for all mandatory buildings
- All outdoor coverage "critical area" solutions
- All below ground coverage solutions
- All dispatch center equipment
- All Coalition member agency equipment
- All system implementation, project management, and testing costs
- All other necessary miscellaneous equipment
- Programming software and accessories
- Warranty and maintenance for 5 years following infrastructure acceptance
- Required spares for vendor provided maintenance program

6	18	\$ *	36	ÉE	8	1	Ē.	

Equipment Discounts	Current	First 2 years AFTER System	Years 3-7 AFTER System Acceptance
Repeater Site Equipmen	%	%	%
Mobile Radios	%	%	%
Portable Radios	%	%	%
Console Equipment	%	%	%
Accessories	%	%	%
Spare Parts	%	%	%

Software Upgrades

YEAR	SOFTWARE UPGRADE	SOFTWARE MAINTENANCE
	2	
	3	
	4	
	5	

OPTION TERMS	ANNUAL FACTOR	MONTHLY FACTOR
Five (5) Years		
Seven (7) Years		
Ten (10) Years		

	EQUIPMENT	EQUIPMENT	TOTAL
CITY OF AUSTIN	1		
Austin Energy			
Aviation Operations	-	( - 10 - 10 )	
Aviation Police	1		
City Hall		-	
Convention Center		-	
Development, Review & Inspection		-	-
Emergency Medical Services			_
Fire Department			
		-	-
Fleet Services			-
Health & Human Services			-
Information Systems			
Library			
Municipal Court - City Marshall's Office			
OEM - Emergency Conference Network			
OEM - Industry & Broadcast Media Network			19.00
Office of Emergency Management			
Parks & Recreation - Operations			
Parks & Recreation - Police			
Police Department		_	
Public Information Office		_	
Public Works & Transportation - Construction Management	· —		
Public Works & Transportation - Street and Bridge			-
Public Works & Transportation - Transportation			-
Radio Communications			-
Solid Waste Services	-		
Storm Water & Drainage Utility			
Utility Customer Services			
Water & Wastewater			
TRAVIS COUNTY			
Constable - Precinct 1			
Constable - Precinct 2			-
Constable - Precinct 3			
Constable - Precinct 4			
Constable - Precinct 5			
County Attorney's Office			
District Attorney's Office			
Elections			_
Emergency Management Services	-		
Facilities Management	1		_
Health Services	-		
Information & Telecommunications Systems	-		
Juvenile Court	-		_
Medical Examiner's Office	-		-
	-		
Sheriff's Office - Information Support	1	1	
Sheriff's Office - Law Enforcement			
Sheriff's Office - Operations			
TNR - Parks			
TNR - Planning & Engineering			
TNR - Road Maintenance			
OTHER AGENCIES/ENTITIES			
ACC - Police			
AISD - Police		-	
AISD - Service Center			
AISD - Transportation	1	-	-
Austin Diagnostic Medical Center			-
Austin Heart Hospital			-
Capital Area Planning Council - 911 Center	-		-
Capital Metropolitan Transportation Authority - Operations & Vehicle	4		
Columbia-Round Rock Community Hospital			-
	-	-	-
Columbia-St. David's Hospital	-		
Pflugerville - Police and Public Works Departments	-		
Seton Hospital			
Seton-Brackenridge Hospital			
Seton-Northwest Hospital			
South Austin Community Hospital			
State of Texas - Legislative Council			-
Texas Department of Transportation - Austin District			
Texas House of Representatives		3	-
Travis County Fire Fighter's Association			-
University of Texas - Police and Operations Departments	-		-
West Lake Hills - Police Department			
		77	-
TOTAL SALVAGE			

FIXED

SUBSCRIBER

B F SEFEE T F F F

#### LOGGING RECORDERS (Annual Pricing)

YEAR	TAPE MEDIA	OPTICAL DISK MEDIA
2		
3		0.0
4		151
5		The second
6		

### **INSTANT RECALL RECORDERS (Annual Pricing)**

YEAR	
2	
3	
4	
5	
6	

# OPTIONAL WARRANTY FOR 5 YEARS AFTER SYSTEM ACCEPTANCE

	Year 1	Year 2	Year 3	Year 4	Year 5
Infrastructure					
	3 -				=
Subscriber Equipment					

On-	Site Field User Training	S
Tra	in-the Trainer Field User Training	S
On-	Site Dispatcher Training	S
Tra	in-the-Training Dispatcher Training	S
Dis	patcher Supervisor Training	S
Syst	em Manager Training	S
Syst	em Maintenance and Technician Training	S
	Category 1 -Mobiles; Portables; Ancillary	
	Equipment; Etc.	\$
	Category 2 (Console Systems; System Manager	
	Systems)	S
	Category 3 (System Infrastructure; Repeater	
	sites; Microwave site controllers; Master	
	Network controllers; Simulcast/Multicast	
	receiver voting, Etc.	S
Off-	Site Training	\$
Hou	rly Rate for Supplemental Training	\$

ITEM	UNIT PRICE
800/900 MHz Simulcast Trunked Repeater	
800/900 MHz Trunked Repeater	
Single Channel 800/900 MHz Conventional	-
Mobile Repeater	
Single Channel Trunked Mobile Repeater	-
Suitcase Trunked System	
325' Self-Supporting Tower w/ Foundation &	
Installation	
Equipment Shelter w/Foundation	
Repeater Site AC Generator	
Receiver Voting Comparators	
Microwave Antenna System	
Continuous Backup Power System	_
Power System and Batter Backup	
Transmit Antenna System	
Receive Antenna System	
NPSPAC Mutual Aid Channel	· ·
SCADA and Alarm System	
Self-Contained Control Station w/ Desk Mic,	
9 dB Yagi Antenna, 75' 1/2" LDF4-50 Coax	
w/Connectors	
Control Station w/ Desk Mic, 9 dB Yagi	
Antenna, 75' 1/2" LDF4-50 Coax	
w/Connectors & External Power Supply	
4 Hour Rechargeable Power System for	
Control Station	
Mobile Radio, Trunk Mount, Analog, Low-	
Tier	
Mobile Radio, Trunk Mount, Analog, Mid-	
Tier	
Mobile Radio, Trunk Mount, Analog, High	-
Tier	
Mobile Radio, Trunk Mount, Digital, Low	
Tier	· ·
Mobile Radio, Trunk Mount, Digital, Mid-	
Tier	-
Mobile Radio, Trunk Mount, Digital, High	
Tier	<u> </u>
Mobile Radio, Dash Mount, Analog, Low	
Tier	
Mobile Radio, Dash Mount, Analog, Mid-	
Tier	-
Mobile Radio, Dash Mount, Analog, High	
Tier	
Mobile Radio, Dash Mount, Digital, Low-	
Tier	
Mobile Radio, Dash Mount, Digital, Mid-	
Tier	
Mobile Radio, Dash Mount, Digital, High-	
Tier	
New Mobile Radio Install w/ Old Radio	
Removal	
New Mobile Radio w/o Old Radio Removal	
Dual Control Head Option for Mobile Radio	
Outside Present Consider for Makilla Dadia	

#### ITEM **UNIT PRICE** Lights, Siren, & PA Control Portable Radio, Analog, Low-Tier Portable Radio, Analog, Mid-Tier Portable Radio, Analog, High-Tier Portable Radio, Digital, Low-Tier Portable Radio, Digital, Mid-Tier Portable Radio, Digital, High-Tier Voice Encryption Option Belt Clip Option for Portable Radio Leather Carrying Case for Portable Radio Spare Portable Radio Battery (as proposed) Individual Charger (1 hour) Bank Charger for Portable Batteries (1 hour) 6 GHz Hot Standby Digital Microwave Hop Sonet Microwave Hop 3 dB Mobile Antenna Headset with Boom Mic Speaker/Microphone Without Antenna (Coiled Cord) Speaker/Microphone w/ Antenna Earphone for Portable (No Microphone) Tactical Headset Single-Ear headset/microphone Headset microphone for bicycle helmet Headset microphone for rescue helmet Headset microphone for Haz-Mat helmet Headset microphone for Motorcycle helmet Bone Conduction microphone w/ earpiece Throat microphone w/ earpiece Hands-Free (voice activated) operation 3-way "Dignitary Protection" headset w/ earpiece & remote mic. Vehicular Charger for Portable (specify Vehicular Charger/Converter w/Microphone, Speaker & External 3 dB Antenna Desktop Remote Control Unit for Control Station Desktop Multi-Channel Console CRT Based Console Operator Position 21" monitor w/ touchscreen capability 19" monitor w/ touchscreen capability 17" monitor 15" monitor Portable Radio Battery Analyzer (specify make/model) Time Synchronization clock System Management Terminal System Alarm Terminal Hardwire line transmitter Digital Logging Recorder-tape media Accessory (describe) Options (describe) Options (describe)

ITEM	UNIT PRICE
Options (describe)	
Digital Logging Recorder-optical disk media	\ <del>-</del>
Accessory (describe)	· ·
Accessory (describe)	
Accessory (describe)	V
Accessory (describe)	-
Accessory (describe)	
Accessory (describe)	
Accessory (describe)	
Options (describe)	
Options (describe)	
Options (describe)	· ·
Options (describe)	
Options (describe)	-
Options (describe)	
Options (describe	-
Digital Instant Recall Recorder	

Fixed End Equipment  (hescrapt = 4	Qty	Unit Cost	Labor	Extended Coss
Master Network Coordinator				
Master Audio Switch				
Equipment Racks				-
Receiver Voting Comparators				
Simulcast Equipment - Sync, Eq, Voting, etc.			1200	
Microwave System				
Microwave Antenna System				
Equipment to Interface with Nearest Fiber Facility				
SCADA and Alarm System				
Equipment Shelter w/Slab & Grounding Improvements				
Continuous Backup Power System				
Auxiliary AC Generator				
Communications Tower, Improvements and/or Construction				
Other Associated Items:				
				7
Cic Part		D-30	-	
Site Equipment Subtotal:	24.00	- 1		
The state of the s	2-10 m			
Labor Subtotal:		940 40	3 %	
	8.7		***************************************	
Equipment and Labor Total	is			
And American Committee of the Committee	Seg my	4 . 34.		
Company of the second s		er en en en	Parest and	Salar Salar Salar
CALL ALL THE ALL MENALS THE BALL TO SHOW YOU THE BALL AND ALL THE BALL TO SHOW THE BALL TO	3-26	المراجعة والمراجعة	4.00m	
Monthly Recurring Expenses:		CC17F1WESSEP 641	St. March	1
	Section of the second	Contraction Assessed and	2.83.5,2	
Monthly Maintenance Cost	A CONTRACTOR OF THE PARTY OF TH		13 X 3 X EX.	
	the same of the same of the	1 TO 15 1 1 1 100 1 100 100 100 100 100 100	2 1 2 1 2 1 1 2 1 2 1 2 1 2 1 2 1 2 1 2	

**Proposed Infrastructure Pricing** 

Site Number: Redundant Master Site

Site Name: TBD

Fired End Equipment Description	Qo	Unit Cost	Labor	Extended Cost
Master Network Coordinator  Master Audio Switch  Equipment Racks  Receiver Voting Comparators  Simulcast Equipment - Sync, Eq. Voting, etc.  Microwave System  Microwave Antenna System  Equipment to Interface with Nearest Fiber Facility  SCADA and Alarm System  Equipment Shelter w/Slab & Grounding Improvements  Continuous Backup Power System  Annilizary AC Generator  Communications Tower, Improvements and/or Construction  Other Associated Items:				
Site Equipment Subtot			<i></i>	ra. Ywa iyo
Equipment and Labor To	4		(	
Monthly Recurring Expense  Monthly Maintenance Co.	et:		April 1918 L	

**Proposed Infrastructure Pricing** 

Site Number: 1

Site Name:

ru ig C oller			
igital runked Simulcast Repeater		 	
Equipment Rack		 . —	
	-	 	
T a System			
Receive Antenn S		 	
Simulcast nuipment - Sync, nu iers, Voi ig, etc.			
6 GHz Microw 'e System			
Microw 'e ia System			
Equipment to In ace Nearest Fiber Facili			
SCADA and Alarm System		 11	
Equipment She 'Slab & Grounding 'em		 -	9
Power System and Battery Backup		 	-
liary Generator	-	 	
Communi ions Tower, Improvements and/or Construction		 	
	-	 	
NPSP Mutual id Channel		 	
Other Associated Items:			
		 1	

w 15

fi n

1 1

**Proposed Infrastructure Pricing** 

4	ς	ît	e	r	Į,	m	m	h		1		8		3		
ē	88	6300	350			2002			S.	ika	Sb.	3	8	88	8	

Site Name:

Tru g Controller				
Digital Trunked Simulcast Repeater				
juipment Rack				
Transmit System				
Receive Antenn System				
			+	
Simulcast Equipm - Sync, jua ers, Voting, etc.	-	0		
6 GHz Microw re System				
Microw e Antenna System				
nuipment to tace Nearest Fiber Faci ity				
SCADA and Alarm System				
Equipment Shelter 'Slab & Grounding Improvements				
Power System and Battery Backup				
ixiliary Generator	-			
Communications Tow , Improvem and/or Construction	-	-		-
NPSP Mutual d Channel				
	-			
Other Associated Items:				

T ig Co iller				
Di Trunked Simulcast Repeater		-		-
Equipment Rack		-		
Transmit System		-		
Receive System				
Simulcast Equipm - Sync, Equalizers, Vi ig, etc.				
6 GHz icrow re System				
Micro 'e System	-			1
Equipment to In ace Nearest Fiber F ity				1
SCADA and Alarm System				
Equipment Shelter 'Slab & Groun '19 Improvements				
Power System and Battery Backup				
ixiliary Generator				
Communi ions Tower, Improvements and/or Constru ion				
NPSP Mutual id Channel				
Other iated Items:		-	_	
100000000000000000000000000000000000000	-		-	
	-	-		

**Proposed Infrastructure Pricing** 

Site Number: 5
Site Name:

Tru g Controller				
Digital Trunked Simulcast Repeater				
Equipment Rack	-			V
Transmit Antenna System			_	
Receive System		11111		
Simulcast Equipment - Sync, Equalizers, Voting, etc.				-
6 GHz icrow 'e System				-
Microw 'e Antenna System				
juipment to In face Nearest Fiber Facility				
SCADA and Alarm System				-
Equipment Shelter w/Slab & Grounding Improvem				
Power System and Battery Backup		-		-
liary Generator				
Communications Tower, ovements and/or Constrution		-		
NPSP Mutual id Channel				-
Other Associated Items:				
Outer Associated Items.				
			-	

g iller igital runked Simuleast Repeater utipment Rack ransmit a System Receive Antenna System Simuleast Equipment - Sync, Equ ers, Vo g, 6 GHz icrow e System Micro e Antenna System Equipment to In lace with Nearest Fiber F. lity SCADA and Alarm System Equipment Subleter w/Slab & Groun g evem Power System and Battery Backup liary AC Generator Communia ions Tower, Improvements and/or Construction NPSP Mutual id Channel Other lated Items:  Site Equipment Subtotal:  Labor Subtotal:  I quipment and Labor Total:  Monthly Recurring Expenses:  Monthly Maintenance Cost:			
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Simulcast Equipment - Sync, Equipment - Sync, Equipment of Micro e System  Micro e Antenna System  Equipment to In Tace with Nearest Fiber Fility  SCADA and Alarm System  Equipm Shelter w/Slab & Groun givem  Power System and Battery Backup  This part of Community on Tower, Improvements and/or Constrution  NPSP Mutual id Channel  Other lated Items:  Site Equipment Subtotal:  Labor Subtotal:  Labor Total:  Monthly Recurring Expenses:	Receive Antenn System		
GHz icrow e System Micro e Antenna System Equipment to In lace with Nearest Fiber F. lity SCADA and Alarm System Equipm Shelter w/Slab & Groun g even Power System and Battery Backup liary AC Generator Communi ions Tower, Improvements and/or Constrution NPSP Mutual id Channel Other lated Items:  Site Equipment Subtotal:  Labor Subtotal:  Labor Subtotal:  Alonthly Recurring Expenses:			
Micro re Antenna System Equipment to In face with Nearest Fiber Fility SCADA and Alarm System Equipm Shelter w/Slab & Groun rg rvem Power System and Battery Backup flary AC Generator Communit ions Tower, Improvements and/or Constrution NPSP Mutual id Channel Other lated Items:  Site Equipment Subtotal:  Labor Subtotal:  I quipment and Labor Total:  Monthly Recurring Expenses:			
Equipment to In face with Nearest Fiber F: lity SCADA and Alarm System Equipm Shelter w/Slab & Groun 'g vem Power System and Battery Backup flary AC Generator Communi ions Tower, Improvements and/or Constrution NPSP Mutual id Channel Other lated Items:  Site Equipment Subtotal:  Labor Subtotal:  Labor Total:  Monthly Recurring Expenses:			
SCADA and Alarm System Equipm Shelter wiSlab & Groun g evem Power System and Battery Backup liary AC Generator Communi lons Tower, Improvements and/or Constru lon NPSP Mutual id Channel Other lated Items:  Site Equipment Subtotal:  Labor Subtotal:  Equipment and Labor Total:  Monthly Recurring Expenses:			
Equipm Shelter w/Slab & Groun 'g wem Power System and Battery Backup  liary AC Generator Communi ions Tower, Improvements and/or Constrution NPSP Mutual id Channel Other liated Items:  Site Equipment Subfotal:  Labor Subtotal:  Equipment and Labor Total:  Monthly Recurring Expenses:			
Tiary AC Generator Communi ions Tower, Improvements and/or Constrution NPSP Mutual id Channel Other lated Items:  Site Equipment Subtotal:  Labor Subtotal:  Equipment and Labor Total:  Monthly Recurring Expenses:	Equipm Shelter w/Slab & Groun g yem		
Communi ions Tower, Improvements and/or Constrution NPSP Mutual id Channel Other lated Items:  Site Equipment Subtotal:  Labor Subtotal:  Equipment and Labor Total:  Monthly Recurring Expenses:			
Communi ions Tower, Improvements and/or Constrution NPSP Mutual id Channel Other lated Items:  Site Equipment Subtotal:  Labor Subtotal:  Equipment and Labor Total:  Monthly Recurring Expenses:	liary AC Generator		
NPSP Other lated Items:  Site Equipment Subtotal:  Labor Subtotal:  Equipment and Labor Total:  Monthly Recurring Expenses:			
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Monthly Recurring Expenses:	Ladui Sudivial.		
Monthly Recurring Expenses:			
	Equipment and Labor Total:		
Monthly Maintenance Cost:	Monthly Recurring Expenses		
Monthly Maintenance Cost:	Monthly Recurring Expenses:		

**Proposed Infrastructure Pricing** 

Site Number: 7

Site Name:

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Tru ig C roller Digital Trunked Simulcast Repeater nuipm Rack T System Receive System Simulcast Equipment - Sync, Equaliz 6 GHz Microw re System icrow re Antenna System Equipment to In face Nearest SCADA and Alarm System Equipment Shelter w/Slab & Ground Power System and Battery Backup Auxiliary Generator Communi ions Tower, Improveme NPSP Mutual id Channel Other Associated Items:	ters, Voting, etc. Fiber F lity ing Improvements		
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Tru ig Controller
Di Trunked Simulcast Repeater Equipment Rack Transmit System Receive Antenn System Simulcast Equipm - Sync, E , 6 GHz Microw re System Microw 'e Antenna System juipment to In tace Nearest Fiber Faci SCADA and Alarm System Equipm Shelter 'Slab & Grounding Improvements Power System and Battery Backup ixi iary Generator Communi ons Tower, Improvements and/or Construction NPSPAC Mutual id Channel Other Associated Items:

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**Proposed Infrastructure Pricing** 

Site Number: 9

Site Name:

Fixed End Equipment  Description	Qty	Unit Cost	Labor	Extended Cost
Frunking Controller				
Digital Trunked Simulcast Repeater				
Equipment Rack				
Fransmit Antenna System				
Receive Antenn System				
Simulcast Equipment - Sync, Equalizers, Voting, etc.				
GHz Microwave System				
Microwave Antenna System			A	
Equipment to Interface with Nearest Fiber Facility				
SCADA and Alarm System				
Equipment Shelter w/Slab & Grounding Improvements		( C. )		
ower System and Battery Backup				
Auxiliary AC Generator				
Communications Tower, Improvements and/or Construction				
NPSPAC Mutual Aid Channel				
Other Associated Items:				
The second of the second		man	-	
Site Equipment Subtotal:			4.	* &
Labor Subtotal:				, A
* The factor			·	
				Married Cong Alexander Congress of the Congres

Monthly Recurring Expenses:

Monthly Maintenance Cost:



Tru ig Controller					
Digital Trunked Simulcast Repeater					
E ruipment Rack					
Transmit Antenna System					
Receive System			-		
Simulcast Equipment - Sync, Equalizers, Voi ig, etc.			-		
6 GHz Microw re System		-			
Microwave Antenna System					
Equipm to face with Nearest Fiber Facility					
SCADA and Alarm System uipment Shelter w/Slab & Grounding Improvements			-	_	-
Power System and Battery Backup					
ixiliary Generator		-			
Communi ions Tower, Im ovem and/or	on		-		
NPSP M (al id Channel	OII		-		_
Other Associated Items		-		-	
Odiel Associated Items					
			_		
		-		-	

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ig iller					
:ed Simi	ilcast Repeater				
Equi ent	Section 1997				
	stem		-	-	
Receive Antenn Syste		-	-		
	- Sync, Voting, etc.			-	
	stem	-			
" re Antenna		-			<del></del>
	Nearest iber F				
		- I			
SCADA and Alarm S					
Equipment Shelter	Slab & Groun ig ements				
Po System and Ba					
lary Genera					
	, ents for Construction		-		
NPS Mutual id	-				
Other iated Iten	is:	100	1.3		
		7			
			22/10/12/22		
10.00 (mg/mg/	Site Equipment Subto	to.	,	1000	**
	Onto Edupatent Sasto	¢are .			
	Labor Subto	tai:			
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s justific	Equipment and Labor To	tal.			3.3
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<b>安保性</b>	Monthly Recurring Expens	sest ···			
		<b>""</b>			THE RESERVE OF THE PARTY OF THE

Monthly Maintenance Cost:

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	Any and an DDA sot hite g coverage so. Total state				
	include 8 hour battery backup.				
1	ıstin Community College				
2	ADMC - ER	-	-		
3	APD H nuarters		-		
4	Co rention Center		-		
5	Barton Creek Mall		-		
6	Bellmont Hall		-		
7	Brackenridge Hospital - ER				
8	Columbia St. D id's South Hosp - ER				
9	Federal Building				_
10	Frank Erwin Center				
11	Highland Mall		-		-
12	Jester C		-		
13	Lakeline Mall				
14	LBJ Library				
15	State lice Buil lig				-
16	Municipal Annex		-		
17	Municipal Building (City Hall)				
18	Municipal Court				_
19	Palmer ditorium	_			
20	Pickle Research Center				
21	Seton Hosp - ER			-	
22	St. D id's Hospital - ER	-			
23	State Capitol Buil 1g & Extension & Underground Complex	-			
24	The Main Library and University Tower				
	Town Lake Center				_
25	T Cou Courthouse				
26	T Co Courthouse Annex			-	-
27					
28	Waller Creek Center				
29	Welch Hall		-		
30	Fire on 1 / AEMS Medic 06				
31	Station 2				
32	Station 5		-		
33	Station 8 / AEMS M ic 07				
34	Station 16				
35	Station 17			-	
36	ion 24				
37	Station 25 / AEMS Medic 10				
38	Station 26	-			
39	Station 27 / AEMS Medic 11				
40	Station 31				
41	S ion 34	Territoria de la constantina della constantina d			
42	Station 36 / AEMS Medic 15 / Police South Sub S on				
43	ion 37				

	Fixed End Equipment Description	-0 <del>6</del>	Unit Cost	Labor	Extended Cost
44	AFR Bergstrom				
45	AFD Headquarters				
46	City Jail / Central Booking	-	-	-	
47	County Jail		-		-
48	New Airport Terminal at Bergstrom		-		-
	Engineering Teaching Center				
49	UT Student Union Building	-	-	-	-
50	The Applied Research Laboratory	-	<del></del>	-	-
51	Seton Northwest - ER	-			
52		-	<del></del>		
53	Anderson High School				_
54	Austin High School	-			0
55	Bailey Middle School				
56	Bedichek Junior High School		4		
57	Bowie High School		-	-	
58	Burnet Middle School				
59	Covington Middle School			1	
60	Crockett High School				
61	Dobie Middle School				
62	Fulmore Middle School				
63	Johnson (LBJ) High School				
64	Johnston High School				
65	Kealing Junior High School	4-2			
66	Lamar Middle School				
67	Lanier High School				
68	Martin Junior High School				
69	McCallum High School				
70	Mendez Junior High				
71	Murchison Middle School				
72	O Henry Junior High				
73	Pearce Middle School		- A		
74	Porter Middle School		-		-
75	Reagan High School				1
76	Travis High School		-		-
77	Webb Middle School				
78	Burger Center Gymnasium	_	-		
79	Saegert Bus Terminal		-		
80	Decker Power Plant	-			-
81	Travis County West Annex		<del></del>	-	
82	UT Police Station				-
83	Curruth Administration Center	-			-
84	Nuclear Engineering Lab	-	-		V-
85	Austin State Hospital Bldg. 784	-			_
	Dobie Mall & Hi Rise	-	-		-
86	Four Seasons Hotel/San Jacinto Center	-	-	-	
87	Hilton Hotel	-	-		- 0

89 Holiday Inn

90	Hyatt Regency Hotel				
91	IBM				
92	IBM				
93	Marri Hotel	-			
94	Medical Park Tower				
95	Hotel	-			
96	Hotel				
97	One Commodore Plaza				-
98	One Texas Center			_	-
99	Pinnacle Building				-
100	R.L. Moore				
101	Radisson Hotel				-
101	RBJ Bu g	-			
	Reagan Building				
103					
104	Sam Houston Bug Sheraton Hotel	_			
105		-			
106	The second secon				<del></del>
107	Specialty Hospital of				
108	Stephen F. Building				
109				_	
110	Supreme Court Bu ding			-	
111	Two Commodore Plaza				
112	U.S. Courthouse				
113	W Manor				
114	. The straight of the control of the straight				
115	William B. Clem ice Bldg.				
116	cation Building @ UT				
117	Fine Arts Library & Bldg Complex				
118					
119	Motorola - Oak Hill				
120	Tracor	-		-	
121	AMD Main				
122	AMD Fab Buil 1 1gs 1,2, & 4	-			-
123	AMD - Lockheed	-			-
124				-	-
125	CALL STATE OF THE		-	-	-
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127	SECTION AND AND AND AND AND AND AND AND AND AN	-			
128		-			
129				-	-
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131			-		-
132					
133	AEMS Rescue 03				

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### Proposed Infrastructure Pricing

### Outdoor Coverage Solutions - Critical Areas

Page 1 OF 2

Fixed End Equipment						
Description	Qty	Unit Cost	Labor	Extended Cost		
Barton Creek Greenbelt						
ALIGH OF CHILDRIN						
			-			
ake Austin				-		
		-	-			
ake Travis						
-						
Pedernales River						
redemales River	· ·	0	-	+		
				-		
			-	-		
Hamilton Pool		_				
(3		1				
Pace Bend Park						
the second secon			-	1		
*						

Description	ed End Equipment Oty	Unit Cost	Labor	Extended Cost
Cow Creek Canyon		-		
	= =			
	= =	===		
ound Mountain/Nameless Road Area				
	= =			
me Creek Area		-		
	_ ==			
owntown & University Area		-	-	
		===		
		-		

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### **Proposed Infrastructure Pricing**

### Indoor Portable Coverage Solutions - Underground Facilities

	nd Equipment			
Description	Qty	Unit Cost	Labor	Extended Cost
niversity of Texas at Austin - Maintenance Tunnels				
inversity of Texas at Austin - Manitenance Tunders				
		-		
Downtown Austin - Utility Tunnels				
Nowatown Austin - Ctimey Tunnels	-			
Valnut Creek Water & Wastewater treatment plant				
				-
Texas Department of Public Safety State Emergency Operations Center				
	-		-	
		-	-	-
			-	-
State of Texas Capital Complex - Underground Office Annex and				
Connecting Hallways			-	
	-			-
			7	

Description	Qty	Unit Cost	Labor	Extended Cost
Transportable Repeater Systems				
Single Channel Conventional Mobile Repeater		2		
Single Channel Trunked Mobile Repeater		واستعتا		
Suitcase Trunked System	1			
	=			
		_		
Site Equipment Subto	nal:			bereit er en
Labor Subto	(1) (1) (	Carlo de Carlo	i <u>na santantanta</u>	Brancia Tana Carani an
Equipment and Labor T		Oktober 1 - Full		
Equipment and Labor 1	otal	-		
Manifely Recurring Expen	ses:	1 42	or the contract of	
				1
Monthly Maintenance C	ONL			

Proposed Infrastructure Pricing

Fixed End Equipment Description	Qņ	Unit Cost	Labor	Extended Cost
Programming Software & Accessories				
				-
		-	-	
Version and the second				a drakin Californ
Site Equipment Subtota	dr		Mayor And Telephone	
Labor Subtota	il:			
Equipment and Labor Tot	ai			
Monthly Recurring Expense	<b>5:</b>			. 1
Monthly Maintenance Cos	<b>a</b> F		though the day	a la

Description	Qty	Unit Cost	Labor	
Recommended Spare Parts				
Site Equipment Subt	otal:	1	and the second of the second	
Labor Subt	otal:			Active to the
Equipment and Labor	<b>L</b> otal			
	· · · · · · · · · · · · · · · · · · ·	eli en elle		وسيسسيستنققق
Monthly Recurring Expe	nses:			
Monthly Maintenance (	Costi	April Birth V. 195	ACM COLOR	

Description	Ob	Unit Cost	Labor	Extended Cost
Recommended Test Equipment				
N .				
	_			
1				
Site Equipment Subto	otal:			
Labor Subti	tal	galanda baran a sa s	1	egytalyters og ur i at 1 Salketilketet tyget og e
		Service and services		isola in a
Equipment and Labor I	A TOTAL OF STREET, THE STREET,		Separately.	
Monthly Recurring Exper	ISES2	Com describy codery. Brown was the Sugar	ija erikus seril San espērala gar	7
Monthly Maintenance C	Linear Market All Car	Maria de la Silla	1000	
Problem Prantenance	Date		And the	*,/ <del></del> **

Proposed Infrastructure Pricing

Fixed End Equipment				
Description	Qty	Unit Cost	Labor	Extended Cost
MCR				
Miscellaneous Equipment				
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THE RESERVE TO SERVE ASSETS.	2.00		MA THE RESERVE	57 E. J. W.
Me Equipment Subto	tal:			
		1000	And the second	*
Labor Subto	tal:			
	775			a Military Connection Connectica Connection
Equipment and Labor To	otal			
		The second second		
Monthly Recurring Expen-	ses:			7
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Monthly Maintenance C	ost:	124	778 - 345 - 4878	

	ANTICIPATED NUMBER OF UNITS	UNIT COST	EXTENDED COST	DISCOUNT (First 2 years after system acceptance)	DISCOUNT (Years 3-7 after system acceptance)
Mobile Radio (trunk mount - analog low tier)	0	-			
Status/Message Capability	0				
Dual Control Head Option	20	255 5.			
Voice Encryption Option	0				-
Outside External Speaker for Mobile Option	0				
Lights, Siren & PA Control Option	0		-		
Headset with Boom Mic	0				
Program & Install Mobile	230			-	
Mobile Radio (trunk Mount - analog high tier)	0				
Status/Message Capability	0			-	
Dual Control Head Option	- 0	-	_		-
Voice Encryption Option	0		-		
Outside External Speaker for Mobile Option	0				-
Lights, Siren & PA Control Option	0				-
Headset with Boom Mic	0			_	-
Program & Install Mobile	0	-			
Mobile Radio (trunk mount - digital low tier)	140				
Status/Message Capability	90	_			_
Dual Control Head Option	41		$\overline{}$		
Voice Encryption Option	16				
Outside External Speaker for Mobile Option	81		<del></del>		_
Lights, Siren & PA Control Option	0				_
Headset with Boom Mic	140	-	<del></del>		_
Program & Install Mobile	140	-			
Program & Hashi Mobile		_	-		
Mobile Radio (trunk mount - digital high tier)	2,755				
Status/Message Capability	425				
Dual Control Head Option	113				
Voice Encryption Option	1,258			3	-
Outside External Speaker for Mobile Option	727				
Lights, Siren & PA Control Option	1,211				
Headset with Boom Mic	15				
Program & Install Mobile	2,755		7		

a E	ANTICIPATED NUMBER OF UNITS	UNIT COST	EXTENDED COST	DISCOUNT (First 2 years after system acceptance)	DISCOUNT (Years 3-7 after system acceptance)
MIND COLUMN	1,001				
Mobile Radio (dash Mount - analog low tier)	0				-
Status/Message Capability					-
Dual Control Head Option	0				-
Voice Encryption Option	0				
Outside External Speaker for Mobile Option	236				
Lights, Siren & PA Control Option	- 0				
Headset with Boom Mic	0		-		
Program & Install Mobile	1,001		-	-	-
Mobile Radio (dash Mount - analog high tier)	626				
Status/Message Capability	68				
Dual Control Head Option	0				
Voice Encryption Option	0				-
Outside External Speaker for Mobile Option	580				
Lights, Siren & PA Control Option	0				
Headset with Boom Mic	0		-	-	
Program & Install Mobile	626				
Mobile Radio (dash Mount - digital low tier)	514				
Status/Message Capability	253				
Dual Control Head Option	20				
Voice Encryption Option	29				
Outside External Speaker for Mobile Option	31			7	
Lights, Siren & PA Control Option	5				
Headset with Boom Mic	0				
Program & Install Mobile	514			-	
Mobile Radio (dash Mount - digital high tier)	333			-	-
Status/Message Capability				-	-
Dual Control Head Option	0		-		-
Voice Encryption Option	25			-	
Outside External Speaker for Mobile Option	156				-
Lights, Siren & PA Control Option	10		_	-	-
Headset with Boom Mic	0				-
Aviation compatible headset microphone	0				
Program & Install Mobile	333				

	ANTICIPATED NUMBER OF UNITS	UNIT COST	EXTENDED COST	DISCOUNT (First 2 years after system acceptance)	DISCOUNT (Years 3-7 after system acceptance)
4 4 8 6				acceptance	acceptance)
Handheld Radio (analog - low tier)	1,152				
Intrinsically Safe Option	166				
Voice Encryption Option	0				
Speaker/Microphone Option	171		VI		
Belt clip Option	1,023				
Leather Carrying Case Option	503				
Vehicular Charger	10				
Vehicular Charger/Converter, mic., ext. antenna	33				
Multiple Unit Bank Charger (radios/batteries)	137				
Individual Unit Rapid Charger	692				
Spare Handheld Radio Battery	428				
Multiple Unit Battery Analyzer/Charger	17				
Tactical Headset	0				
Dignitary Protection 3-Way Headset	0				
Headset with Boom Mic	0	_			
Single-ear headset microphone	0				_
Headset microphone for bicycle helmt mounting	0				
Headset microphone for rescue helmet mounting	0				
Headset microphone for Haz-Mat helmet mounting	0				
Motorcycle Headsets	0				
Program Handheld	1,152				
Handheld Radio (analog - high tier)	930				
Intrinsically Safe Option	209			-	
Voice Encryption Option	0	_	_		
Speaker/Microphone Option	358			_	-
Belt clip Option	708	_			
Leather Carrying Case Option	493				
Vehicular Charger	- 493				
Vehicular Charger/Converter, mic., ext. antenna	101				
Multiple Unit Bank Charger (radios/batteries)	47				_
Individual Unit Rapid Charger	180	-			
Spare Handheld Radio Battery	375		-	-	-
Multiple Unit Battery Analyzer/Charger	10				
Tactical Headset	10		-		
			$\overline{}$		-
Dignitary Protection 3-Way Headset Headset with Boom Mic	0 0	-			<del></del>
			-	-	
Single-ear headset microphone	0	$\overline{}$			-
Headset microphone for bicycle helmt mounting	0				,
Headset microphone for rescue helmet mounting	0	-	-		92
Headset microphone for Haz-Mat helmet mounting	0				-
Motorcycle Headsets	0				
Program Handheld	930				

	ANTICIPATED NUMBER OF UNITS	UNIT COST	EXTENDED COST	DISCOUNT (First 2 years after system acceptance)	DISCOUNT (Years 3-7 after system acceptance)
Handheld Radio (digital - low tier)	573				
Intrinsically Safe Option	219			-	
Voice Encryption Option	84				
Speaker/Microphone Option	132				-
Belt clip Option	458	_			
Leather Carrying Case Option	503	-			
Vehicular Charger	46				
Vehicular Charger/Converter, mic., ext. antenna	3				
Multiple Unit Bank Charger (radios/batteries)	58			_	
Individual Unit Rapid Charger	419				
Spare Handheld Radio Battery	345				
Multiple Unit Battery Analyzer/Charger	42	_			
Tactical Headset	0		-		
Dignitary Protection 3-Way Headset	0				
Headset with Boom Mic	0				
Single-ear headset microphone	0				
Headset microphone for bicycle helmt mounting	0	-		-	
Headset microphone for rescue helmet mounting	0			-	
Headset microphone for Haz-Mat helmet mounting	0			( <del></del>	
Motorcycle Headsets	0	$\overline{}$			
Program Handheld	573		-	7	-
		_		-	
Handheld Radio (digital - high tier)	3,738			-	
Intrinsically Safe Option	3,219				
Voice Encryption Option	2,137				
Speaker/Microphone Option	3,596			-	
Belt clip Option	3,152				
Leather Carrying Case Option	3,604				
Vehicular Charger	135				
Vehicular Charger/Converter, mic., ext. antenns	250				
Multiple Unit Bank Charger (radios/batteries)	198	9			
Individual Unit Rapid Charger	3,309				
Spare Handheld Radio Battery	1,960				
Multiple Unit Ballery Analyzer/Charger	81				
Tactical Headset	55				
Diamitary Protection 3-Way Headset	116				
Headset with Boom Mic	55				
Single-car headset microphone	94				
Headset missophone for bicycle helmt mounting	52	3			
Headset misrophone for rescue helmet mounting	25				
Headset misrophone for Haz-Mat helmet mounting	12				
Motoroycle Headsets	75				
Bone-Conduction microphone w/ purpiece	47				
Hands-free operation (voice activated) untion	52				
Program Handheld	3,738		$\overline{}$	-	

HSPATCH FACILITIES	ANTICIPATED NUMBER OF UNITS	UNIT COST	EXTENDED COST	DISCOUNT (First 2 years after system acceptance)	DISCOUNT (Years 3-7 after system acceptance)
Console Electronics Switch/Interface	24				
21" Touchscreen CRT Dispatch Console	128				
OPTIONAL 15" CRT console	- 120				
OPTIONAL 17" CRT console					
OPTIONAL 19" CRT Touchscreen Dispatch Console					
30 Talkgroup Logging Recorder Interface	128	_			
Control Station w/Outside Antenna, Installed	419				-
Control Station w/Inside Antenna, Installed	125				$\overline{}$
Desktop Dispatch Remote, Installed	151	-			
Separate 4 Hour Battery Backup for Control Stations	544				
Time Synchronization Clock	23	-		-	
Uninterruptible Power Supply (UPS)	23				_
System Management Terminal	18				
System Alarm Terminal	18	-			$\overline{}$
APP C-UT-I	40				
APD Call Taker console	40				
APD Call Taker Training console	4				
APD Call Taker Supervisor console	1				
APD Dispatcher (Primary) console	14	1		V	
APD Dispatcher (Information) console	2				
APD Dispatcher (Tactical) console	3				
APD Dispatcher (Training) console	2				
APD Dispatcher Supervisor console	1				-
AFD Call Taker console	0				
AFD Combination Call-Taker/Dispatcher console	0				
AFD Supervisor console	0	_	-		_
AEMS Call Taker console	0				
AEMS Combination Operations/Tactial console	. 0			-	
AEMS Supervisor console	0				
AEMS Communication Manager's console	0	-	-		_
TCSO Dispatcher console	0				,
TCSO Dispatcher console TCSO Supervisor console	0	_			
TCSO Dispatcher console TCSO Supervisor console TNR Call Taker console		$\equiv$			
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TCSO Dispatcher console TCSO Supervisor console TNR Call Taker console	0	$\equiv$		$\equiv$	
TCSO Dispatcher console TCSO Supervisor console TNR Call Taker console TNR Combination Call Taker/Dispatcher console	0 0				
TCSO Dispatcher console TCSO Supervisor console TNR Call Taker console TNR Combination Call Taker/Dispatcher console TNR Supervisor console	0 0 0				

#### City of Austin Request for Proposal No. RFP VC98300024 Issued on 6/15/98

	ANTICIPATED NUMBER OF UNITS	UNIT COST	EXTENDED COST	DISCOUNT (First 2 years after system acceptance)	DISCOUNT (Years 3-7 after system acceptance)
Hardwire line transmitter (for use in Cave Rescue Operations)	3				
IMPLEMENTATION COSTS					
Programming Software and Accessories for Mobiles Programming Software and Accessories for handhelds Programming Software and Accessories for Dispatch	=	=	=	_	=
Facilities Cosnole Installation & Setup		· ·	_		-
Optional First Year Maintenance, after Warranty		-			
Project Management & Supervision-Mobiles					
Project Management & Supervision-handhelds					
Project Management & Supervision-Dispatch Facilities					
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#### SUMMARY OF SUBSCRIBER EQUIPMENT

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	nk Mour sh Moun		230 1,627	2,895 847	3,125 2,474
SI	JBTOTA	AL MOBILE RADIOS	1,857	3,742	5,599
8	8		2,082	4,311	6,393
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		Mobile	e Radio (	trunk me		unt - analog low tier)				
	Mobile Radio (trunk mount - analog low tier)	Status/Message Capability	Dual Control Head Option	Voice Encryption Option	Outside External Speaker for Mobile	Lights, Siren & PA Control Option	Headset with Boom Mic	Program & Install Mobile		
	Mol	Stat	Den	Voi	Out	op Lig	Неа	Pro		
CITY OF AUSTIN										
Austin Energy										
Aviation Operations										
Aviation Police				-			-			
City Hall Convention Center		-	-	-		-	-			
Development, Review & Inspection		-					-			
Emergency Medical Services								_		
Fire Department							1			
Fleet Services			1							
Health & Human Services										
Information Systems	1					jo .				
Library	4									
Municipal Court - City Marshall's Office										
OEM - Emergency Conference Network OEM - Industry & Broadcast Media Network										
OEM - Industry & Broadcast Media Network Office of Emergency Management	-				-		-	_		
Parks & Recreation - Operations										
Parks & Recreation - Police										
Police Department										
Public Information Office										
Public Works & Transportation - Construction Management	1									
Public Works & Transportation - Street and Bridge										
Public Works & Transportation - Transportation										
Radio Communications										
Solid Waste Services			_		_					
Storm Water & Drainage Utility Utility Customer Services			-							
Water & Wastewater						-	$\rightarrow$			
TRAVIS COUNTY										
Constable - Precinct 1										
Constable - Precinct 2										
Constable - Precinct 3										
Constable - Precinct 4										
Constable - Precinct 5										
County Attorney's Office										
District Attorney's Office										
Elections		i	-	_						
Emergency Management Services Facilities Management										
Health Services										
Information & Telecommunications Systems		-		-			-			
Juvenile Court										
Medical Examiner's Office										
Sheriff's Office - Information Support				. 7.22						
Sheriff's Office - Law Enforcement										
Sheriff's Office - Operations										
TNR - Parks										
TNR - Planning & Engineering										
TNR - Road Maintenance OTHER AGENCIES/ENTITIES										
ACC - Police										
AISD - Police	-									
AISD - Service Center										
AISD - Transportation										
Austin Diagnostic Medical Center										
Austin Heart Hospital										
Capital Area Planning Council - 911 Center										
Capital Metropolitan Transportation Authority - Operations & Vehicle										
Maintenance										
Columbia-Round Rock Community Hospital Columbia-St. David's Hospital										
Pflugerville - Police and Public Works Departments										
Seton Hospital										
Seton-Brackenridge Hospital										
Seton-Northwest Hospital										
South Austin Community Hospital										
State of Texas - Legislative Council										
Texas Department of Transportation - Austin District										
Texas House of Representatives										
	230		20					230		
Travis County Fire Fighter's Association	200						_			
Travis County Fire Fighter's Association University of Texas - Police and Operations Departments West Lake Hills - Police Department										

### Author Common Protects   C			Mobil	e Radio	trunk Mo	oung - an	alog high	tier)					
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Avaitance Protoce City Hall Convention Center Development, Review & Inspection Emergency Medical Services Fire Department Fire Services Fire Servi	CITY OF AUSTIN												
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Convention Center Development, Review & Inspection Emergency Medical Services Fixed Services Fixed Services Health & Human Services Information Systems Library Municipal Court - City Marshalfs Office OEM: Emergency Conference Network OEM: Emergency Network OEM:	TO POPALISO TO VIEW												
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Emergency Medical Services													
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Municipal Court - City Marshalls Office  GEM - Emergency Conference Network  GEM - Industry & Broadcast Media Network  Parks & Recreation - Operations  Parks & Recreation - Police  Police Department  Public Information Office  Public Works & Transportation - Steet and Bridge  Public Works & Transportation - Transportation  Radio Communications  Solid Waste Services  Solid Waste Services  Solid Waste Services  Solid Waste Services  Waster & Wastewarer  ***TRANS** COUNT**  Constable - Precinct 1  Constable - Precinct 1  Constable - Precinct 2  Constable - Precinct 2  Constable - Precinct 3  Constable - Precinct 4  Constable - Precinct 4  Constable - Precinct 5  County Attorney's Office  District Attorney's Office  Sheriff's Office - Law Enforcement  Sheriff's Office - Departation - Sheriff's Office  District Attorney's Office  Sheriff's Office - Law Enforcement  Sheriff's Office - Departation - Austro Disposition - Austro Dispositio	Information Systems												
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Sheriff's Office - Law Enforcement Sheriff's Office - Operations TNR - Parks TNR - Parks TNR - Planning & Engineering TNR - Road Maintenance OTHER AGENCIES/ENTITIES ACC - Police AISD - Police AISD - Service Center AISD - Transportation Austin Diagnostic Medical Center Austin Heart Hospital Capital Area Planning Council - 911 Center Capital Metropolitan Transportation Authority - Operations & Vehicle Maintenance Columbia-Round Rock Community Hospital Columbia-St. David's Hospital Pflugerville - Police and Public Works Departments Seton Hospital Seton-Borstal Seton-Borsta													
Sheriff's Office - Operations TNR - Parks TNR - Planning & Engineering TNR - Road Maintenance OTHER AGENCIES/ENTITIES ACC - Police AISD - Police AISD - Police AISD - Service Center AISD - Transportation Austin Diagnostic Medical Center Austin Diagnostic Medical Center Austin Heart Hospital Capital Area Planning Council - 911 Center Capital Metropolitan Transportation Authority - Operations & Vehicle Maintenance Columbia-Round Rock Community Hospital Columbia-Round Rock Community Hospital Columbia-Round Rock Community Hospital Seton-Brackenridge Hospital Se							-	-	-				
TNR - Parks TNR - Planning & Engineering TNR - Road Maintenance OTHER AGENCIES/ENTITIES ACC - Police AISD - Police AISD - Police AISD - Service Center AISD - Transportation Austin Diagnostic Medical Center Austin Diagnostic Medical Center Austin Heart Hospital Capital Metropolitan Transportation Authority - Operations & Vehicle Maintenance Columbia-Round Rock Community Hospital Columbia-St., David's Hospital Pflugerville - Police and Public Works Departments Seton Hospital Seton-Northwest Hospital Seton-Northwest Hospital Seton-Northwest Hospital State of Texas - Legislative Council Texas Department of Transportation - Austin District Texas House of Representatives Travis County Fire Fighter's Association University of Texas - Police and Operations Departments West Lake Hills - Police Department	Appropriate to the second seco												
TNR - Road Maintenance OTHER AGENCIES/ENTITIES ACC - Police AISD - Police AISD - Service Center AISD - Transportation Austin Diagnostic Medical Center Austin Diagnostic Medical Center Austin Heart Hospital Capital Area Planning Council - 911 Center Capital Metropolitan Transportation Authority - Operations & Vehicle Maintenance Columbia-Round Rock Community Hospital Columbia-St. David's Hospital Pflugerville - Police and Public Works Departments Seton Hospital Seton-Brackenridge Hospital Seton-Brackenridge Hospital Seton-Northwest Hospital South Austin Community Hospital State of Texas - Legislative Council Texas Department of Transportation - Austin District Texas House of Representatives Travis County Fire Fighter's Association University of Texas - Police and Operations Departments West Lake Hills - Police Department	TNR - Parks												
OTHER AGENCIES/ENTITIES  ACC - Police AISD - Police AISD - Service Center AISD - Transportation Austin Diagnostic Medical Center Austin Heart Hospital Capital Area Planning Council - 911 Center Capital Metropolitan Transportation Authority - Operations & Vehicle Maintenance Columbia-Round Rock Community Hospital Columbia-St. David's Hospital Pflugerville - Police and Public Works Departments Seton Hospital Seton-Northwest Hospital South Austin Community Hospital South Austin Community Hospital State of Texas - Legislative Council Texas Department of Transportation - Austin District Texas House of Representatives Travis County Fire Fighter's Association University of Texas - Police Department West Lake Hills - Police Department					وأساسا								
ACC - Police  AISD - Police  AISD - Service Center  AISD - Service Center  AISD - Transportation  Austin Diagnostic Medical Center  Austin Heart Hospital  Capital Area Planning Council - 911 Center  Capital Metropolitan Transportation Authority - Operations & Vehicle  Maintenance  Columbia-Round Rock Community Hospital  Columbia-St. David's Hospital  Pflugerville - Police and Public Works Departments  Seton Hospital  Seton-Borackenridge Hospital  Seton-Northwest Hospital  South Austin Community Hospital  South Austin Community Hospital  State of Texas - Legislative Council  Texas Department of Transportation - Austin District  Texas House of Representatives  Travis County Fire Fighter's Association  University of Texas - Police and Operations Departments  West Lake Hills - Police Department													
AISD - Police  AISD - Service Center  AISD - Transportation  Austin Diagnostic Medical Center  Austin Heart Hospital  Capital Area Planning Council - 911 Center  Capital Metropolitan Transportation Authority - Operations & Vehicle  Maintenance  Columbia-Round Rock Community Hospital  Columbia-St. David's Hospital  Pflugerville - Police and Public Works Departments  Seton Hospital  Seton-Brackenridge Hospital  Seton-Northwest Hospital  South Austin Community Hospital  South Austin Community Hospital  State of Texas - Legislative Council  Texas Department of Transportation - Austin District  Texas House of Representatives  Travis County Fire Fighter's Association  University of Texas - Police and Operations Departments  West Lake Hills - Police Department					-								
AISD - Service Center  AISD - Transportation  Austin Diagnostic Medical Center  Austin Heart Hospital  Capital Area Planning Council - 911 Center  Capital Metropolitan Transportation Authority - Operations & Vehicle  Maintenance  Columbia-Round Rock Community Hospital  Columbia-St. David's Hospital  Pflugerville - Police and Public Works Departments  Seton Hospital  Seton-Brackenridge Hospital  Seton-Northwest Hospital  South Austin Community Hospital  State of Texas - Legislative Council  Texas Department of Transportation - Austin District  Texas House of Representatives  Travis County Fire Fighter's Association  University of Texas - Police and Operations Departments  West Lake Hills - Police Department													
AISD - Transportation  Austin Diagnostic Medical Center  Austin Heart Hospital Capital Area Planning Council - 911 Center Capital Metropolitan Transportation Authority - Operations & Vehicle Maintenance Columbia-Round Rock Community Hospital Columbia-St. David's Hospital Pflugerville - Police and Public Works Departments Seton Hospital Seton-Brackenridge Hospital Seton-Brackenridge Hospital South Austin Community Hospital South Austin Community Hospital Texas Department of Transportation - Austin District Texas Department of Transportation - Austin District Texas House of Representatives Travis County Fire Fighter's Association University of Texas - Police and Operations Departments West Lake Hills - Police Department				770									
Austin Diagnostic Medical Center  Austin Heart Hospital  Capital Area Planning Council - 911 Center  Capital Metropolitan Transportation Authority - Operations & Vehicle Maintenance  Columbia-Round Rock Community Hospital  Columbia-St. David's Hospital  Pflugerville - Police and Public Works Departments  Seton Hospital  Seton-Brackenridge Hospital  Seton-Northwest Hospital  South Austin Community Hospital  State of Texas - Legislative Council  Texas Department of Transportation - Austin District  Texas House of Representatives  Travis County Fire Fighter's Association  University of Texas - Police and Operations Departments  West Lake Hills - Police Department													
Capital Area Planning Council - 911 Center  Capital Metropolitan Transportation Authority - Operations & Vehicle Maintenance  Columbia-Round Rock Community Hospital  Columbia-St. David's Hospital  Pflugerville - Police and Public Works Departments  Seton Hospital  Seton-Brackenridge Hospital  Seton-Northwest Hospital  South Austin Community Hospital  State of Texas - Legislative Council  Texas Department of Transportation - Austin District  Texas House of Representatives  Travis County Fire Fighter's Association  University of Texas - Police and Operations Departments  West Lake Hills - Police Department	Austin Diagnostic Medical Center												
Capital Metropolitan Transportation Authority - Operations & Vehicle Maintenance Columbia-Round Rock Community Hospital Columbia-St. David's Hospital Pflugerville - Police and Public Works Departments Seton Hospital Seton-Brackenridge Hospital Seton-Northwest Hospital South Austin Community Hospital State of Texas - Legislative Council Texas Department of Transportation - Austin District Texas House of Representatives Travis County Fire Fighter's Association University of Texas - Police and Operations Departments West Lake Hills - Police Department					1								
Maintenance Columbia-Round Rock Community Hospital Columbia-St. David's Hospital Pflugerville - Police and Public Works Departments Seton Hospital Seton-Brackenridge Hospital Seton-Northwest Hospital South Austin Community Hospital State of Texas - Legislative Council Texas Department of Transportation - Austin District Texas House of Representatives Travis County Fire Fighter's Association University of Texas - Police and Operations Departments West Lake Hills - Police Department													
Columbia-Round Rock Community Hospital  Columbia-St. David's Hospital  Pflugerville - Police and Public Works Departments  Seton Hospital  Seton-Brackenridge Hospital  Seton-Northwest Hospital  South Austin Community Hospital  State of Texas - Legislative Council  Texas Department of Transportation - Austin District  Texas House of Representatives  Travis County Fire Fighter's Association  University of Texas - Police and Operations Departments  West Lake Hills - Police Department													
Columbia-St. David's Hospital  Pflugerville - Police and Public Works Departments  Seton Hospital  Seton-Brackenridge Hospital  Seton-Northwest Hospital  South Austin Community Hospital  State of Texas - Legislative Council  Texas Department of Transportation - Austin District  Texas House of Representatives  Travis County Fire Fighter's Association  University of Texas - Police and Operations Departments  West Lake Hills - Police Department													
Pflugerville - Police and Public Works Departments  Seton Hospital  Seton-Brackenridge Hospital  Seton-Northwest Hospital  South Austin Community Hospital  State of Texas - Legislative Council  Texas Department of Transportation - Austin District  Texas House of Representatives  Travis County Fire Fighter's Association  University of Texas - Police and Operations Departments  West Lake Hills - Police Department								-					
Seton-Brackenridge Hospital  Seton-Northwest Hospital  South Austin Community Hospital  State of Texas - Legislative Council  Texas Department of Transportation - Austin District  Texas House of Representatives  Travis County Fire Fighter's Association  University of Texas - Police and Operations Departments  West Lake Hills - Police Department													
Seton-Northwest Hospital  South Austin Community Hospital  State of Texas - Legislative Council  Texas Department of Transportation - Austin District  Texas House of Representatives  Travis County Fire Fighter's Association  University of Texas - Police and Operations Departments  West Lake Hills - Police Department	Seton Hospital	1											
South Austin Community Hospital  State of Texas - Legislative Council  Texas Department of Transportation - Austin District  Texas House of Representatives  Travis County Fire Fighter's Association  University of Texas - Police and Operations Departments  West Lake Hills - Police Department													
State of Texas - Legislative Council  Texas Department of Transportation - Austin District  Texas House of Representatives  Travis County Fire Fighter's Association  University of Texas - Police and Operations Departments  West Lake Hills - Police Department		1											
Texas Department of Transportation - Austin District  Texas House of Representatives  Travis County Fire Fighter's Association  University of Texas - Police and Operations Departments  West Lake Hills - Police Department													
Texas House of Representatives Travis County Fire Fighter's Association University of Texas - Police and Operations Departments West Lake Hills - Police Department													
Travis County Fire Fighter's Association  University of Texas - Police and Operations Departments  West Lake Hills - Police Department													
University of Texas - Police and Operations Departments  West Lake Hills - Police Department							-	-					
West Lake Hills - Police Department													
TOTAL 0 0 0 0 0 0 0			Tank										
	TOTAL	0	8	0	0	0	0	0	0				

				(trunk m	4-	gital low t	tier)	
	Mobile Radio trunk mount digital low tier	Status/Message Capability	Dual Control Head Option	Voice Encryption Option	Outside External Speaker Mobile	Lights, Siren & PA Control Option	Headset with Boom Mic	Program & Install Mobile
CITY OF AUSTIN	1	0,						
Austin Energy			1					
Aviation Operations	16	16	16	16	16	5		16
Aviation Police City Hall							-	
Convention Center								
Development, Review & Inspection								
Emergency Medical Services								
Fire Department Fleet Services								
Health & Human Services						-	-	
Information Systems								
Library						1		
Municipal Court - City Marshall's Office								
OEM - Emergency Conference Network OEM - Industry & Broadcast Media Network								
Office of Emergency Management						-		
Parks & Recreation - Operations	50							50
Parks & Recreation - Police								
Police Department								
Public Information Office								
Public Works & Transportation - Construction Management Public Works & Transportation - Street and Bridge							-	
Public Works & Transportation - Transportation							-	
Radio Communications								
Solid Waste Services								
Storm Water & Drainage Utility								
Utility Customer Services Water & Wastewater								
TRAVIS COUNTY							$\rightarrow$	
Constable - Precinct 1								
Constable - Precinct 2								
Constable - Precinct 3								
Constable - Precinct 4								
Constable - Precinct 5 County Attorney's Office		-					-	
District Attorney's Office		-				-		
Elections								
Emergency Management Services								
Facilities Management								
Health Services Information & Telecommunications Systems							-	
Juvenile Court						-		
Medical Examiner's Office								
Sheriff's Office - Information Support								
Sheriff's Office - Law Enforcement								
Sheriff's Office - Operations TNR - Parks	26	26	26		26			20
TNR - Planning & Engineering	25 15	25 15	25		25 15		-	25 15
TNR - Road Maintenance	25	25			25			25
OTHER AGENCIES/ENTITIES								
ACC - Police								
AISD - Police AISD - Service Center								
AISD - Service Center AISD - Transportation	9	9						9
Austin Diagnostic Medical Center							-	
Austin Heart Hospital								
Capital Area Planning Council - 911 Center								
Capital Metropolitan Transportation Authority - Operations & Vehicle								
Maintenance Columbia-Round Rock Community Hospital						-	-	_
Columbia-St. David's Hospital								
Pflugerville - Police and Public Works Departments								
Seton Hospital								
Seton-Brackenridge Hospital								
Seton-Northwest Hospital								
South Austin Community Hospital State of Texas - Legislative Council								
Texas Department of Transportation - Austin District						-		
Texas House of Representatives								
Travis County Fire Fighter's Association								
University of Texas - Police and Operations Departments								
West Lake Hills - Police Department								
TOTAL	140	90	41	16	81	5	0	140

	-		e Radio (	trunk m	ount - di	gital high	tier)			
	Mobile Radio trunk mount digital Ihigh tier	Status/Message Capability	Dual Control Head Option	Voice Encryption Option	Outside External Speaker Mobile	Lights, Siren & PA Contro Option	Headset with Boom Mic	Program & Install Mobile		
CITY OF AUSTIN								-		
Austin Energy	240				140	-		240		
Aviation Operations Aviation Police	10	10			10	10	-	10		
City Hall	10	10			10	10		10		
Convention Center										
Development, Review & Inspection										
Emergency Medical Services Fire Department	95 170	_	45 10	95 37	45 88	45 34		95 170		
Fleet Services	170		10	31	0.0	34		170		
Health & Human Services	18							18		
Information Systems	1	1						1		
Library										
Municipal Court - City Marshall's Office OEM - Emergency Conference Network	15			15		15		15		
OEM - Industry & Broadcast Media Network										
Office of Emergency Management										
Parks & Recreation - Operations										
Parks & Recreation - Police	26	26		26		26		26		
Police Department Public Information Office	1,000		10	1,000		1,000	15	1,000		
Public Works & Transportation - Construction Management										
Public Works & Transportation - Street and Bridge										
Public Works & Transportation - Transportation										
Radio Communications										
Solid Waste Services					-					
Storm Water & Drainage Utility Utility Customer Services										
Water & Wastewater										
TRAVIS COUNTY										
Constable - Precinct 1	10				10	10		10		
Constable - Precinct 2  Constable - Precinct 3	10	10		10		10		10		
Constable - Precinct 3	21					21		21		
Constable - Precinct 5	45							45		
County Attorney's Office										
District Attorney's Office										
Elections Emergency Management Services	131	13	8	11	9	9		13		
Facilities Management	15	13	0	- 11	,	-		1.5		
Health Services										
Information & Telecommunications Systems										
Juvenile Court										
Medical Examiner's Office Sheriff's Office - Information Support	4			4				4		
Sheriff's Office - Law Enforcement	300	300	10	30	300			300		
Sheriff's Office - Operations	35				10	10		35		
TNR - Parks	30	30	30	30	30			30		
TNR - Planning & Engineering										
TNR - Road Maintenance OTHER AGENCIES/ENTITIES	25	25			25		-	25		
ACC - Police	5							5		
AISD - Police										
AISD - Service Center										
AISD - Transportation										
Austin Diagnostic Medical Center Austin Heart Hospital										
Capital Area Planning Council - 911 Center	-									
Capital Metropolitan Transportation Authority - Operations & Vehicle										
Maintenance	576							576		
Columbia-Round Rock Community Hospital			1							
Columbia-St. David's Hospital Pflugerville - Police and Public Works Departments	57				50			57		
Seton Hospital	3,1				30			31		
Seton-Brackenridge Hospital										
Seton-Northwest Hospital										
South Austin Community Hospital State of Texas - Legislative Council										
State of Texas - Legislative Council Texas Department of Transportation - Austin District	1					-				
Texas House of Representatives										
Travis County Fire Fighter's Association			1.3							
University of Texas - Police and Operations Departments	25							25		
West Lake Hills - Police Department	10	10			10	10		10		
TOTAL	2,755	425	113	1,258	727	1,211	15	2,755		

		Mobi	le Radio	(dash M	ount - an	alog low	tier)	
	Mobile Radio dash Mount analog low tier	Status/Message Capability	Dual Control Head Option	Voice Encryption Option	Outside External Speaker I Mobile	Lights, Siren & PA Control Option	Headset with Boom Mic	Program & Install Mobile
CITY OF AUSTIN								
Austin Energy								
Aviation Operations								
Aviation Police								
City Hall Convention Center							-	-
Development, Review & Inspection								
Emergency Medical Services		-		-				
Fire Department								
Fleet Services								
Health & Human Services	4							4
Information Systems								
Library  Municipal Court - City Marshall's Office								
OEM - Emergency Conference Network								
OEM - Industry & Broadcast Media Network								
Office of Emergency Management								
Parks & Recreation - Operations								
Parks & Recreation - Police								
Police Department Public Information Office								
Public Information Office Public Works & Transportation - Construction Management							-	
Public Works & Transportation - Street and Bridge							-	
Public Works & Transportation - Transportation		-						-
Radio Communications								
Solid Waste Services								
Storm Water & Drainage Utility	7				7			7
Utility Customer Services	50							50
Water & Wastewater TRAVIS COUNTY							-	
Constable - Precinct 1								
Constable - Precinct 2			-					
Constable - Precinct 3			-					
Constable - Precinct 4								
Constable - Precinct 5								
County Attorney's Office								
District Attorney's Office Elections								
Emergency Management Services								
Facilities Management								
Health Services	24							24
Information & Telecommunications Systems								-
Juvenile Court								
Medical Examiner's Office	1							
Sheriff's Office - Information Support Sheriff's Office - Law Enforcement	-							
Sheriff's Office - Operations								
TNR - Parks	7							
TNR - Planning & Engineering								
TNR - Road Maintenance	225				225			225
OTHER AGENCIES/ENTITIES								
ACC - Police								
AISD - Police  AISD - Service Center	170							170
AISD - Service Center AISD - Transportation	496				4		-	170 496
Austin Diagnostic Medical Center	.50				7			470
Austin Heart Hospital								
Capital Area Planning Council - 911 Center								
Capital Metropolitan Transportation Authority - Operations & Vehicle								
Maintenance Columbia-Round Rock Community Hospital								
Columbia-Round Rock Community Hospital							-	
Pflugerville - Police and Public Works Departments								-
Seton Hospital								
Seton-Brackenridge Hospital								
Seton-Northwest Hospital								
South Austin Community Hospital								
State of Texas - Legislative Council Texas Department of Transportation - Austin District								
Texas Department of Transportation - Austin District Texas House of Representatives							-	
Travis County Fire Fighter's Association								
						$\rightarrow$	$\longrightarrow$	
University of Texas - Police and Operations Departments	25							25
	25 1,001	0	0	0	236	0	0	1,001

		Mobil	le Radio	(dash Mo	ount- and	alog high	tier)	
	Mobile Radio dash Mount analog high tier	Status/Message Capability	Dual Control Head Option	Voice Encryption Option	Outside External Speaker ! Mobile	Lights, Siren & PA Control Option	Headset with Boom Mic	Program & Install Mobile
CITY OF AUSTIN								
Austin Energy								
Aviation Operations								
Aviation Police								
City Hall								
Convention Center								
Development, Review & Inspection  Emergency Medical Services	-							
Fire Department							_	
Fleet Services								
Health & Human Services								
Information Systems								
Library								
Municipal Court - City Marshall's Office								
OEM - Emergency Conference Network								
OEM - Industry & Broadcast Media Network								
Office of Emergency Management								
Parks & Recreation - Operations								
Parks & Recreation - Police					-			
Police Department Public Information Office								
Public Works & Transportation - Construction Management		-					-	
Public Works & Transportation - Street and Bridge	130			-	130			130
Public Works & Transportation - Transportation	68	68		-	50			68
Radio Communications								
Solid Waste Services								
Storm Water & Drainage Utility		4.5						
Utility Customer Services					1			
Water & Wastewater	428				400			428
TRAVIS COUNTY								
Constable - Precinct 1								
Constable - Precinct 2 Constable - Precinct 3								
Constable - Precinct 4								
Constable - Precinct 5								
County Attorney's Office								
District Attorney's Office								
Elections								
Emergency Management Services								
Facilities Management								
Health Services								
Information & Telecommunications Systems								
Juvenile Court  Medical Examiner's Office								
Sheriff's Office - Information Support								
Sheriff's Office - Law Enforcement				_				
Sheriff's Office - Operations								
TNR - Parks								
TNR - Planning & Engineering			1					
TNR - Road Maintenance								
OTHER AGENCIES/ENTITIES								
ACC - Police								
AISD - Police								
AISD - Service Center								
AISD - Transportation								
Austin Diagnostic Medical Center Austin Heart Hospital								
Capital Area Planning Council - 911 Center	_							
Capital Metropolitan Transportation Authority - Operations & Vehicle								
Maintenance								
Columbia-Round Rock Community Hospital								
Columbia-St. David's Hospital			1					
Pflugerville - Police and Public Works Departments								
Seton Hospital								
Seton-Brackenridge Hospital								
Seton-Northwest Hospital								
South Austin Community Hospital								
State of Texas - Legislative Council								
Towns Donaton of Transportation August District							-	
Texas Department of Transportation - Austin District								
Texas House of Representatives								
Texas House of Representatives Travis County Fire Fighter's Association								
Texas House of Representatives								

	dash Mount				-	y Control		Mobile
	Mobile Radio das digital low tier	Status/Message Capability	Dual Control Head Option	Voice Encryption Option	Outside External Speaker Mobile	Lights, Siren & PA Control Option	Headset with Boom Mic	Program & Install Mobile
CITY OF AUSTIN								
Austin Energy Aviation Operations	29	29		29	29	5		29
Aviation Police	29	29		29	29	3	-	29
City Hall								
Convention Center								
Development, Review & Inspection								
Emergency Medical Services Fire Department				-			-+	- 1
Fleet Services	15	15			2	-		15
Health & Human Services								
Information Systems								
Library								
Municipal Court - City Marshall's Office								
OEM - Emergency Conference Network OEM - Industry & Broadcast Media Network		-				-	-	
Office of Emergency Management								
Parks & Recreation - Operations								
Parks & Recreation - Police								
Police Department								
Public Information Office Public Works & Transportation - Construction Management		-			4			_
Public Works & Transportation - Construction Management Public Works & Transportation - Street and Bridge			-					
Public Works & Transportation - Transportation				-				
Radio Communications								
Solid Waste Services	209	209						209
Storm Water & Drainage Utility								
Utility Customer Services Water & Wastewater								
TRAVIS COUNTY								
Constable - Precinct 1								
Constable - Precinct 2								
Constable - Precinct 3								
Constable - Precinct 4 Constable - Precinct 5								
County Attorney's Office							$\rightarrow$	
District Attorney's Office								
Elections	15							15
Emergency Management Services	- 1				4			
Facilities Management Health Services	15							15
Information & Telecommunications Systems								
Juvenile Court					-		-	
Medical Examiner's Office								
Sheriff's Office - Information Support								
Sheriff's Office - Law Enforcement								
Sheriff's Office - Operations TNR - Parks								
TNR - Planning & Engineering		-					-	
TNR - Road Maintenance		1						
OTHER AGENCIES/ENTITIES								
ACC - Police								
AISD - Police								
AISD - Service Center AISD - Transportation							-	
Austin Diagnostic Medical Center							_	
Austin Heart Hospital						-		
Capital Area Planning Council - 911 Center								
Capital Metropolitan Transportation Authority - Operations & Vehicle								
Maintenance Columbia-Round Rock Community Hospital								
Columbia-Round Rock Community Hospital  Columbia-St. David's Hospital								
Pflugerville - Police and Public Works Departments								
Seton Hospital								
Seton-Brackenridge Hospital								
Seton-Northwest Hospital								
South Austin Community Hospital State of Texas - Legislative Council			-				4	
Texas Department of Transportation - Austin District							-	
Texas House of Representatives							-	
Travis County Fire Fighter's Association	230		20					230
University of Texas - Police and Operations Departments							= 1	
West Lake Hills - Police Department					35			

		igh tier)							
	Mobile Radio dash Mount digital high tier	Status/Message Capability	Dual Control Head Option	Voice Encryption Option	Outside External Speaker f Mobile	Lights, Siren & PA Control Option	Headset with Boom Mic	Aviation compatible headse microphone	Program & Install Mobile
CITY OF AUSTIN									
Austin Energy	215				150				215
Aviation Operations Aviation Police		-		-		_	-	-	
City Hall	4	-	-	4		-		-	4
Convention Center									
Development, Review & Inspection									
Emergency Medical Services	11			11					11
Fire Department Fleet Services				_					
Health & Human Services		-	-	-		-	-		-
Information Systems		_							
Library									
Municipal Court - City Marshall's Office	9								
OEM - Emergency Conference Network									
OEM - Industry & Broadcast Media Network Office of Emergency Management	70			2		-			70
Parks & Recreation - Operations	2	2		2	-	-			2
Parks & Recreation - Police									
Police Department									
Public Information Office									
Public Works & Transportation - Construction Management									
Public Works & Transportation - Street and Bridge Public Works & Transportation - Transportation		-		-			-	-	
Radio Communications	8	8		8					8
Solid Waste Services	- 0	-		,					0
Storm Water & Drainage Utility	3				3				3
Utility Customer Services									
Water & Wastewater		-		_					
TRAVIS COUNTY  Constable - Precinct 1		-		-	-		-		_
Constable - Precinct 2	-			-			-		
Constable - Precinct 3									
Constable - Precinct 4									
Constable - Precinct 5									
County Attorney's Office District Attorney's Office	3				3				3
Elections			-	-		-	-		
Emergency Management Services									
Facilities Management									
Health Services	5			-					5
Information & Telecommunications Systems									
Juvenile Court  Medical Examiner's Office		-		_					
Sheriff's Office - Information Support	-	-	-	-	-		-		
Sheriff's Office - Law Enforcement	10	10	-	-		10			10
Sheriff's Office - Operations						- 15			
TNR - Parks									
TNR - Planning & Engineering									
TNR - Road Maintenance OTHER AGENCIES/ENTITIES									
ACC - Police	-	-	_	-		-		-	
AISD - Police				-			-		
AISD - Service Center									
AISD - Transportation									
Austin Diagnostic Medical Center									
Austin Heart Hospital Capital Area Planning Council - 911 Center	-	-			_		-		
Capital Metropolitan Transportation Authority - Operations & Vehicle		-		-	-		-	-	
Maintenance									
Columbia-Round Rock Community Hospital									
Columbia-St. David's Hospital									
Pflugerville - Police and Public Works Departments Seton Hospital							-		
Seton-Brackenridge Hospital				-		-	-		
Seton-Northwest Hospital		-	-				-		
South Austin Community Hospital									
State of Texas - Legislative Council									
Texas Department of Transportation - Austin District						1			
Texas House of Representatives									
Travis County Fire Fighter's Association		-		-			_		
University of Texas - Police and Operations Departments									
University of Texas - Police and Operations Departments  West Lake Hills - Police Department	2								2

		-			iheld Ra	dio (anal	og - low	tier):	<u> </u>		
	Handheld Radio analog low tier	Intrinsically Safe Option	Voice Encryption Option	Speaker/Microphone Optio	Belt clip Option	Leather Carrying Case Option	Vehicular Charger	Vehicular Charger/Converter, mic., e antenna	Multiple Unit Bank Charger radios/batteries	Individual Unit Rapid Charger	Spare Handheld Radio Battery
CITY OF AUSTIN					1						
Austin Energy								-			
Aviation Operations							_	- /			
Aviation Police City Hall		-									
Convention Center											
Development, Review & Inspection	65	65			65	65				65	65
Emergency Medical Services											
Fire Department											
Fleet Services Health & Human Services	12	-				12			1	4	12
Information Systems	12			-		12			1	- 4	12
Library											-
Municipal Court - City Marshall's Office											
OEM - Emergency Conference Network											
OEM - Industry & Broadcast Media Network											
Office of Emergency Management Parks & Recreation - Operations	124			-	119	5	-			124	20
Parks & Recreation - Operations  Parks & Recreation - Police	124				119	3				124	20
Police Department											
Public Information Office											
Public Works & Transportation - Construction Management											
Public Works & Transportation - Street and Bridge											
Public Works & Transportation - Transportation Radio Communications										_	
Solid Waste Services		-									
Storm Water & Drainage Utility	32			10	32	32	10	10		32	
Utility Customer Services	15				15					15	
Water & Wastewater											
TRAVIS COUNTY  Constable - Precinct 1						-	-				
Constable - Precinct 2											
Constable - Precinct 3											- 10 10
Constable - Precinct 4 Constable - Precinct 5			-	-					_		
County Attorney's Office	-		-	-		-					
District Attorney's Office											
Elections	25				25					25	
Emergency Management Services								1-3		1	
Facilities Management Health Services	25				25					25	- 11
Information & Telecommunications Systems	11					11			1	4	11
Juvenile Court	41	-		20	41				3	4	11
Medical Examiner's Office										4	41
Sheriff's Office - Information Support											
Sheriff's Office - Law Enforcement											
Sheriff's Office - Operations TNR - Parks	56	**		**		**			0	477	20
TNR - Planning & Engineering	36	56	-	56		56			9	47	28
TNR - Road Maintenance	45	45		45		45			7	38	23
OTHER AGENCIES/ENTITIES											
ACC - Police											
AISD - Police AISD - Service Center	99				99	-		-	16		
AISD - Service Center  AISD - Transportation	22			-	22	22		22		10	22
Austin Diagnostic Medical Center		-								-	
Austin Heart Hospital	1 1										
Capital Area Planning Council - 911 Center											
Capital Metropolitan Transportation Authority - Operations & Vehicle											
Maintenance Columbia-Round Rock Community Hospital			_								
Columbia-Round Rock Community Hospital  Columbia-St. David's Hospital			-	-							
Pflugerville - Police and Public Works Departments											
Seton Hospital											
Seton-Brackenridge Hospital											
Seton-Northwest Hospital						1					
South Austin Community Hospital											
State of Texas - Legislative Council Texas Department of Transportation - Austin District	-										
Texas House of Representatives	15			15	15	15		1		15	15
Travis County Fire Fighter's Association	240				240	240			45	150	150
University of Texas - Police and Operations Departments	325			25	325				55	130	30
West Lake Hills - Police Department											
TOTAL	1,152	166	0	171	1,023	503	10	33	137	692	428

				dheld Ra	dio (ana	log - low	tier) co	nt.		
	Multiple Unit Battery Analy er/Charger	Tactical Headset	Dignitary Protection 3-Way Headset	Headset with Boom Mic	Single-ear headset microphone	Headset microphone for bicycle helmt mounting	Headset microphone for rescue helmet mounting	Headset microphone for Ha Mat helmet mounting	Motorcycle Headsets	Program Handheld
CITY OF AUSTIN										
Austin Energy										
Aviation Operations										
Aviation Police City Hall	_				-	-		_		_
Convention Center		-						_		
Development, Review & Inspection										65
Emergency Medical Services										
Fire Department										
Fleet Services										
Health & Human Services								-		12
Information Systems				-	-	-		-	-4	
Library Municipal Court - City Marshall's Office	-						-			
OEM - Emergency Conference Network										
OEM - Industry & Broadcast Media Network										
Office of Emergency Management										
Parks & Recreation - Operations	2									124
Parks & Recreation - Police										
Police Department							-	-	-	
Public Information Office Public Works & Transportation - Construction Management								-	-	
Public Works & Transportation - Construction Management Public Works & Transportation - Street and Bridge						-	-		-	-
Public Works & Transportation - Transportation	-			-						
Radio Communications										
Solid Waste Services										
Storm Water & Drainage Utility										32
Utility Customer Services										15
Water & Wastewater TRAVIS COUNTY				-						
Constable - Precinct 1				-		_	-			-
Constable - Precinct 2			-			-			-	
Constable - Precinct 3										
Constable - Precinct 4	1									
Constable - Precinct 5										
County Attorney's Office										
District Attorney's Office										
Elections Emergency Management Services	1									25
Facilities Management	1						-		-	25
Health Services	-	-			-	-	-	_	-	11
Information & Telecommunications Systems										- 11
Juvenile Court										41
Medical Examiner's Office						-				
Sheriff's Office - Information Support										
Sheriff's Office - Law Enforcement								-		3.5
Sheriff's Office - Operations TNR - Parks					-		-		-	
TNR - Planning & Engineering					_		-	-		56
TNR - Road Maintenance						-	-		-	45
OTHER AGENCIES/ENTITIES										.,,
ACC - Police										
AISD - Police							- 10			99
AISD - Service Center										22
AISD - Transportation Austin Diagnostic Medical Center										
Austin Diagnostic Medical Center Austin Heart Hospital							-		-	
Capital Area Planning Council - 911 Center										
Capital Metropolitan Transportation Authority - Operations & Vehicle										
Maintenance										
Columbia-Round Rock Community Hospital										
Columbia-St. David's Hospital										
Pflugerville - Police and Public Works Departments										
Seton Hospital Seton-Brackenridge Hospital			-	-	-	-	-		-	-
Seton-Brackenridge Hospital Seton-Northwest Hospital						-	-	$\rightarrow$		
South Austin Community Hospital		0.11		-		- 1		-	-	
State of Texas - Legislative Council										
Texas Department of Transportation - Austin District										
Texas House of Representatives	1									15
Travis County Fire Fighter's Association	10									240
University of Texas - Police and Operations Departments West Lake Hills - Police Department	2									325

	Handheld Radio (analog - high tier)									
	Handheld Radio analog - high tier	Intrinsically Safe Option	Voice Encryption Option	Speaker/Microphone Option	Belt clip Option	Leather Carrying Case Option	Vehicular Charger	Vehicular Charger/Converter, mic., ext. antenna	Multiple Unit Bank Charger radios/batteries	Individual Unit Rapid Charger
CITY OF AUSTIN							\ \ \			
Austin Energy										
Aviation Operations										
Aviation Police City Hall						-				
Convention Center	181		-	181		181			25	33
Development, Review & Inspection	101									
Emergency Medical Services										
Fire Department					J					
Fleet Services										
Health & Human Services Information Systems		-					_	-		
Library						-				
Municipal Court - City Marshall's Office										
OEM - Emergency Conference Network										
OEM - Industry & Broadcast Media Network										
Office of Emergency Management										
Parks & Recreation - Operations	50				45	. 5				50
Parks & Recreation - Police Police Department			-							
Public Information Office										
Public Works & Transportation - Construction Management	57	57		16	57	57			-	57
Public Works & Transportation - Street and Bridge	74	74		10	74	74			9	30
Public Works & Transportation - Transportation	78	78		41	42	76			12	9
Radio Communications										
Solid Waste Services		-	-							
Storm Water & Drainage Utility Utility Customer Services					-	_	-	-		-
Water & Wastewater	480			100	480	100		100		
TRAVIS COUNTY										
Constable - Precinct 1										
Constable - Precinct 2										
Constable - Precinct 3 Constable - Precinct 4										
Constable - Precinct 4  Constable - Precinct 5						-				-
County Attorney's Office										
District Attorney's Office							-			
Elections										
Emergency Management Services										
Facilities Management										
Health Services Information & Telecommunications Systems	-									
Juvenile Court										
Medical Examiner's Office										
Sheriff's Office - Information Support										
Sheriff's Office - Law Enforcement										
Sheriff's Office - Operations TNR - Parks			_							
TNR - Planning & Engineering		-				-				
TNR - Road Maintenance					-					
OTHER AGENCIES/ENTITIES										
ACC - Police										
AISD - Police										
AISD - Service Center AISD - Transportation										
Austin Diagnostic Medical Center			_			-				
Austin Heart Hospital										
Capital Area Planning Council - 911 Center										
Capital Metropolitan Transportation Authority - Operations & Vehicle										
Maintenance										
Columbia-Round Rock Community Hospital Columbia-St. David's Hospital										
Pflugerville - Police and Public Works Departments			_							
Seton Hospital										
Seton-Brackenridge Hospital										
Seton-Northwest Hospital										
South Austin Community Hospital					-		-			
State of Texas - Legislative Council										
Texas Department of Transportation - Austin District Texas House of Representatives	10			10	10			,		-
Travis County Fire Fighter's Association	10			10	10			1	1	- 1
University of Texas - Police and Operations Departments										
West Lake Hills - Police Department										
TOTAL	930	209	0	358	708	493	0	101	47	180

				Handbel	d Radio	(digital -	low tier	) +		
	Handheld Radio digital - low tier	Intrinsically Safe Option	Voice Encryption Option	Speaker/Microphone Option	Belt clip Option	Leather Carrying Case Option	Vehicular Charger	Vehicular Charger/Converter, mic., ext antenna	Multiple Unit Bank Charger radios/batteries	Individual Unit Rapid Charger
CITY OF AUSTIN										
Austin Energy										
Aviation Operations	78	78	78		78	78			11	25
Aviation Police City Hall						-			-	
Convention Center										
Development, Review & Inspection										
Emergency Medical Services										
Fire Department										
Fleet Services	13	13			13	13				13
Health & Human Services Information Systems			_				-			-
Library	9		-			6			1	
Municipal Court - City Marshall's Office			-						-	
OEM - Emergency Conference Network							311			
OEM - Industry & Broadcast Media Network										
Office of Emergency Management										
Parks & Recreation - Operations										
Parks & Recreation - Police										
Police Department	-	-								
Public Information Office Public Works & Transportation - Construction Management	$\vdash$	-								
Public Works & Transportation - Street and Bridge		-								
Public Works & Transportation - Transportation										
Radio Communications										
Solid Waste Services	37				37	37	37			31
Storm Water & Drainage Utility	9				9	9	9			9
Utility Customer Services										
Water & Wastewater TRAVIS COUNTY		-								
Constable - Precinct 1	-	-								
Constable - Precinct 2			-							
Constable - Precinct 3										
Constable - Precinct 4			= 3500							
Constable - Precinct 5					( = )					
County Attorney's Office										
District Attorney's Office										
Elections Emergency Management Services	2	- 2			2				-	-
Facilities Management	3	3	-		3		_			
Health Services			-			-	-	-		
Information & Telecommunications Systems										
Juvenile Court										
Medical Examiner's Office					i ii					
Sheriff's Office - Information Support					1					
Sheriff's Office - Law Enforcement										
Sheriff's Office - Operations										
TNR - Parks TNR - Planning & Engineering	40 16	40 16	-	40 16		40				40
TNR - Road Maintenance	10	10		10	_	16			_	10
OTHER AGENCIES/ENTITIES	10	10	-	10		10				10
ACC - Police	50	50		40	10	40			1	50
AISD - Police										
AISD - Service Center										
AISD - Transportation	9	9			9	9				9
Austin Diagnostic Medical Center										
Austin Heart Hospital										
Capital Area Planning Council - 911 Center Capital Metropolitan Transportation Authority - Operations & Vehicle										-
Maintenance										
Columbia-Round Rock Community Hospital		+								
Columbia-St. David's Hospital										
Pflugerville - Police and Public Works Departments										
Seton Hospital										
Seton-Brackenridge Hospital										
Seton-Northwest Hospital										
South Austin Community Hospital State of Texas - Legislative Council	40	_			/0		-			
Texas Department of Transportation - Austin District	48	-	-	20	48					48
Texas House of Representatives	6		6	6	6			3		-
rexas nouse of Representatives	U		U	U				3		
Travis County Fire Fighter's Association	245				245	245			45	150
	245				245	245			45	150

				Handhel	d Radio (	(analog -	high tie	r) cont.			
	Spare Handheld Radio Battery	Multiple Unit Battery Analy er/Charger	Tactical Headset	Dignitary Protection 3-Way Headset	Headset with Boom Mic	Single-ear headset microphone	Headset microphone for bicycle helmt mounting	Headset microphone for rescue helmet mounting	Headset microphone for Ha Mat helmet mounting	Motorcycle Headsets	Program Handheld
CITY OF AUSTIN	N W	ΣĀ	Ľ	äĬ	Ĭ	IN E	ăă	Ĭ ĕ	ĬΣ	Ž	4
Austin Energy		-								-	
Aviation Operations	_										
Aviation Police											
City Hall											
Convention Center	181	2									181
Development, Review & Inspection											
Emergency Medical Services											
Fire Department				_							
Fleet Services Health & Human Services	-					-					
Information Systems							-	_			-
Library	-										
Municipal Court - City Marshall's Office				-		-	-			-	
OEM - Emergency Conference Network							+		1		
OEM - Industry & Broadcast Media Network											
Office of Emergency Management											
Parks & Recreation - Operations	50					7			1 2		50
Parks & Recreation - Police		0				===?					
Police Department											
Public Information Office											
Public Works & Transportation - Construction Management	16	5									57
Public Works & Transportation - Street and Bridge Public Works & Transportation - Transportation	18										74 78
Radio Communications				-							/8
Solid Waste Services				-						_	
Storm Water & Drainage Utility											
Utility Customer Services											
Water & Wastewater	100	3									480
TRAVIS COUNTY											
Constable - Precinct 1											
Constable - Precinct 2											
Constable - Precinct 3											
Constable - Precinct 4  Constable - Precinct 5											
County Attorney's Office							-				
District Attorney's Office						-					
Elections											
Emergency Management Services		-									
Facilities Management						-					
Health Services											
Information & Telecommunications Systems											
Juvenile Court											
Medical Examiner's Office											
Sheriff's Office - Information Support											
Sheriff's Office - Law Enforcement Sheriff's Office - Operations											
TNR - Parks	-										
TNR - Planning & Engineering											
TNR - Road Maintenance	-						-			_	
OTHER AGENCIES/ENTITIES											
ACC - Police											
AISD - Police											
AISD - Service Center											
AISD - Transportation											
Austin Diagnostic Medical Center											
Austin Heart Hospital Capital Area Planning Council - 911 Center											
Capital Metropolitan Transportation Authority - Operations & Vehicle											_
Maintenance											
Columbia-Round Rock Community Hospital											
Columbia-St. David's Hospital	-										
Pflugerville - Police and Public Works Departments											
Seton Hospital									1		
Seton-Brackenridge Hospital											1
Seton-Northwest Hospital						- 6					
South Austin Community Hospital					-						
State of Texas - Legislative Council											
State of Texas - Legislative Council Texas Department of Transportation - Austin District											
State of Texas - Legislative Council Texas Department of Transportation - Austin District Texas House of Representatives	10										10
State of Texas - Legislative Council Texas Department of Transportation - Austin District Texas House of Representatives Travis County Fire Fighter's Association	10										10
State of Texas - Legislative Council Texas Department of Transportation - Austin District Texas House of Representatives	10										10

				Handhel	d Radio	(digital -	low tier)	cont.			
	Spare Handheld Radio Battery	Multiple Unit Battery Analy er/Charger	Tactical Headset	Dignitary Protection 3-Way Headset	Headset with Boom Mic	Single-ear headset microphone	Headset microphone for bicycle helmt mounting	Headset microphone for rescue helmet mounting	Headset microphone for Ha Mat helmet mounting	Motorcycle Headsets	Program Handheld
CITY OF AUSTIN											
Austin Energy											
Aviation Operations	78	11									78
Aviation Police											
City Hall Convention Center	-			-	-	-				-	
Development, Review & Inspection	_	-			-						
Emergency Medical Services											
Fire Department											
Fleet Services		6									13
Health & Human Services											
Information Systems Library	-		-	-		-	-	-	-	-	9
Municipal Court - City Marshall's Office		-			-+	-	-		-		
OEM - Emergency Conference Network											
OEM - Industry & Broadcast Media Network					1						
Office of Emergency Management											
Parks & Recreation - Operations											
Parks & Recreation - Police											
Police Department Public Information Office	-					-					
Public Works & Transportation - Construction Management	-					-					
Public Works & Transportation - Street and Bridge											
Public Works & Transportation - Transportation											
Radio Communications											
Solid Waste Services	18	5									37
Storm Water & Drainage Utility											9
Utility Customer Services Water & Wastewater	-	-								-	
TRAVIS COUNTY	-				-						
Constable - Precinct 1											
Constable - Precinct 2											
Constable - Precinct 3											
Constable - Precinct 4		-									
Constable - Precinct 5											
County Attorney's Office District Attorney's Office	-	_		-							
Elections	-	+	-		-						
Emergency Management Services	3						-				3
Facilities Management											
Health Services											
Information & Telecommunications Systems											
Juvenile Court						-					
Medical Examiner's Office Sheriff's Office - Information Support				-	-		-			-	
Sheriff's Office - Law Enforcement		-		_		-	-				
Sheriff's Office - Operations							-				
TNR - Parks	20										40
TNR - Planning & Engineering	8										16
TNR - Road Maintenance	5										10
OTHER AGENCIES/ENTITIES  ACC - Police			-	-		-	-			-	***
AISD - Police	6				-	-					50
AISD - Service Center											
AISD - Transportation	3										9
Austin Diagnostic Medical Center											
Austin Heart Hospital											
Capital Area Planning Council - 911 Center											
Capital Metropolitan Transportation Authority - Operations & Vehicle Maintenance											
Columbia-Round Rock Community Hospital								-		$\rightarrow$	
Columbia-St. David's Hospital									-		
Pflugerville - Police and Public Works Departments											
Seton Hospital											
Seton-Brackenridge Hospital									X		
Seton-Northwest Hospital											
South Austin Community Hospital State of Texas - Legislative Council	40							-			44
	48	-			-				-		48
Hexas Department of Transportation - Austin District		-		-	-	_		-		-	6
Texas Department of Transportation - Austin District Texas House of Representatives	6		- 1								
Texas House of Representatives Travis County Fire Fighter's Association	6 150	20									245
Texas House of Representatives	_	20									245

					held Rac	lio (digi	al - high				
	Handheld Radio digital - high tier	Intrinsically Safe Option	Voice Encryption Option	Speaker/Microphone Optio	Belt clip Option	Leather Carrying Case Option	Vehicular Charger	venicular Charger/Converter, mic., ex antenna	Multiple Unit Bank Charger radios/batteries	Individual Unit Rapid Charger	Spare Handheld Radio Battery
CITY OF AUSTIN	205	204		395	395	395				395	395
Austin Energy Aviation Operations	395	395		393	393	393				393	393
Aviation Police	50			50	50				1	50	10
City Hall	12		12	4	12			4		12	12
Convention Center											
Development, Review & Inspection											
Emergency Medical Services Fire Department	209 388	209 388	209 64	234 393	259 83	413 317	46	59	72	209 87	375
Fleet Services	300	300	04	393	63	317	.22		12	07	373
Health & Human Services	19				19	19				19	19
Information Systems	2	2	2	2	2	2		1		2	
Library	10			4	4	10			1	6	
Municipal Court - City Marshall's Office	35	35	35	35	35	35			3	35	35
OEM - Emergency Conference Network OEM - Industry & Broadcast Media Network	35				35					35	35
Office of Emergency Management	6	6	6	22	6	2		4		6	20
Parks & Recreation - Operations	Ĭ	Ü	U		Ü			7		J	20
Parks & Recreation - Police	50		50	50	10	40			3	50	20
Police Department	1618	1618	1618	1618	1618	1618			80	1618	250
Public Information Office	5	5	5	5	5	1		1		5	5
Public Works & Transportation - Construction Management Public Works & Transportation - Street and Bridge			4								
Public Works & Transportation - Street and Bridge  Public Works & Transportation - Transportation											
Radio Communications	16	16	16		16	16		16	2	16	
Solid Waste Services											
Storm Water & Drainage Utility	9			2	9	9	9			9	5
Utility Customer Services											
Water & Wastewater TRAVIS COUNTY											
Constable - Precinct 1 Constable - Precinct 2	7		17	7	17	7	-	17	2	3	3
Constable - Precinct 2	17 21		17	17 21	17	17		17	2	17	17
Constable - Precinct 4	8			8	8	- 1				2	2
Constable - Precinct 5	45			45		45			1	45	5
County Attorney's Office	3			3		3				3	3
District Attorney's Office	20	20	20	20	20		4	16		20	20
Elections Emergency Management Services	16	16	16	18	16		1	3	2	8	42
Facilities Management	10	10	10	10	10		- 4	3		0	42
Health Services	5			2	3	2				5	.5
Information & Telecommunications Systems	10	10			10	10				10	10
Juvenile Court											
Medical Examiner's Office											
Sheriff's Office - Information Support Sheriff's Office - Law Enforcement	300	300	30	26 300	300	300		26 100	- 4	26 300	300
Sheriff's Office - Operations	81	81	30	81	13	67		100	1	67	67
TNR - Parks	35	35	35	35	10	35	35			35	18
TNR - Planning & Engineering											
TNR - Road Maintenance OTHER AGENCIES/ENTITIES	15	15		15		15	15			15	8
ACC - Police											
AISD - Police AISD - Service Center	50			50	50	-		-		50	
AISD - Service Center  AISD - Transportation	2				2	2		2			2
Austin Diagnostic Medical Center											
Austin Heart Hospital					y :						
Capital Area Planning Council - 911 Center											
Capital Metropolitan Transportation Authority - Operations & Vehicle	46			150	200				F.33.		
Maintenance Columbia-Round Rock Community Hospital	85			40	85	45			15	25	10
Columbia-St. David's Hospital											
Pflugerville - Police and Public Works Departments Seton Hospital	41			24	27	50			9	11	
Seton-Brackenridge Hospital								-			
Seton-Northwest Hospital						70					
South Austin Community Hospital											
State of Texas - Legislative Council											
Texas Department of Transportation - Austin District											
Texas House of Representatives											
Travis County Fire Fighter's Association University of Texas - Police and Operations Departments	68	68	2	68	2	68		1		68	2
West Lake Hills - Police Department	22	08		08	5	22			2	22	
TOTAL	3,738	3,219	2,137	3,596	3,152	3,604	135	250	198	3,309	1,960

				Hand	held Rac	lio (digi	al - high		ont.		- W 1	
	Multiple Unit Battery Analy er/Charger	Tactical Headset	Dignitary Protection 3-Way Headset	Headset with Boom Mic	Single-ear headset microphone	Headset microphone for bicycle helmt mounting	Headset microphone for rescue helmet mounting	Headset microphone for Ha Mat helmet mounting	Motorcycle Headsets	Bone-Conduction microphone w/ earpiece	Hands-free operation voice activated option	Program Handheld
CITY OF AUSTIN												205
Austin Energy	6					-	- title	-				395
Aviation Operations Aviation Police	1									-		50
City Hall	1											12
Convention Center												
Development, Review & Inspection												
Emergency Medical Services Fire Department	30 18	10	16	30	10	12	15 10	12		12	27	209 388
Fleet Services	10	10	16	30	10		10			10		300
Health & Human Services												19
Information Systems												2
Library												10
Municipal Court - City Marshall's Office												35
OEM - Emergency Conference Network OEM - Industry & Broadcast Media Network												35
Office of Emergency Management	3				16							6
Parks & Recreation - Operations												3
Parks & Recreation - Police	2											50
Police Department	10	45	100	25	50	40			75	25	25	1618
Public Information Office												5
Public Works & Transportation - Construction Management Public Works & Transportation - Street and Bridge												-
Public Works & Transportation - Transportation												
Radio Communications	1											16
Solid Waste Services												
Storm Water & Drainage Utility								1				9
Utility Customer Services Water & Wastewater												
	-											
TRAVIS COUNTY  Constable - Precinct 1												7
Constable - Precinct 2	1											17
Constable - Precinct 3	1											21
Constable - Precinct 4	1				5.55							8
Constable - Precinct 5 County Attorney's Office	1											45
District Attorney's Office			+					-				20
Elections						"						20
Emergency Management Services	2				8							16
Facilities Management												
Health Services												5
Information & Telecommunications Systems Juvenile Court												10
Medical Examiner's Office		-						-				
Sheriff's Office - Information Support												26
Sheriff's Office - Law Enforcement	3											300
Sheriff's Office - Operations												81
TNR - Parks												35
TNR - Planning & Engineering TNR - Road Maintenance		-										15
OTHER AGENCIES/ENTITIES												13
ACC - Police		E										
AISD - Police												50
AISD - Service Center						-						2
AISD - Transportation Austin Diagnostic Medical Center												
Austin Heart Hospital							_					
Capital Area Planning Council - 911 Center												
Capital Metropolitan Transportation Authority - Operations & Vehicle												
Maintenance												85
Columbia-Round Rock Community Hospital Columbia-St. David's Hospital												
Pflugerville - Police and Public Works Departments					-		-					41
Seton Hospital												41
Seton-Brackenridge Hospital												
Seton-Northwest Hospital												
South Austin Community Hospital												
State of Texas - Legislative Council Texas Department of Transportation - Austin District												
Texas Department of Transportation - Austin District Texas House of Representatives												2
Travis County Fire Fighter's Association						1						- 4
University of Texas - Police and Operations Departments												68
West Lake Hills - Police Department												22
TOTAL	81	55	116	55	94	52	25	12	75	47	52	3,738

					Dispa	tch Faci	ilities				
	Console Electronics Switch/Interface	21 Touchscreen CRT Dispatch Console	30 Talkgroup Logging Recorder Interface	Control Station w/Outside Antenna, Installed	Control Station w/Inside Antenna, Installed	Desktop Dispatch Remote, Installed	Separate 4 Hour Battery Backup for Control Stations	Time Synchroni ation Clock	Uninterruptible Power Supply UPS	System Management Terminal	System Alarm Terminal
CITY OF AUSTIN	0 0	(4 1	(1) IL	0 4	0 4		07 LL		20,	0,	- 07
Austin Energy	1	16	16	20		N TH	20	1	1	1	1
Aviation Operations	1	2	2	4			4	1	1		
Aviation Police	1	3	3	10			10	1	1	1	1
City Hall Convention Center					2		2				
Development, Review & Inspection	-			2	1	2	2			-	
Emergency Medical Services	2	16	16	40		3	40	2	2	2	2
Fire Department	2	12	12	28			28	2	2	2	2
Fleet Services				6	/		6				
Health & Human Services	1	1	1	2		2	2	1	1		
Information Systems Library				1			1				
Municipal Court - City Marshall's Office				-							
OEM - Emergency Conference Network					30		30				
OEM - Industry & Broadcast Media Network					35		35				
Office of Emergency Management	1	4	4	8			8			1	1
Parks & Recreation - Operations Parks & Recreation - Police				1		2	1				
Police Department	3	44	44	107		-	107	3	3	3	2
Public Information Office	3	-4-4	-1-4	107	1		107	3	3	3	3
Public Works & Transportation - Construction Management				4		4	4				
Public Works & Transportation - Street and Bridge				1		3	1				
Public Works & Transportation - Transportation				4		15	4				
Radio Communications Solid Waste Services				1		10	1			1	1
Storm Water & Drainage Utility	-			9	-	10	9			-	
Utility Customer Services				1		2	1				
Water & Wastewater	1	3	3	48		10	48	1	i	1	1
TRAVIS COUNTY											
Constable - Precinct 1				1		1	1			1	1
Constable - Precinct 2 Constable - Precinct 3				3		4	3				
Constable - Precinct 4				1		2	1				
Constable - Precinct 5				3		4	3				
County Attorney's Office											
District Attorney's Office											
Elections Emergency Management Services				5		5	1				
Facilities Management				1		2	5	-	-	-	
Health Services				1		2	1				
Information & Telecommunications Systems				1			1				
Juvenile Court											
Medical Examiner's Office											
Sheriff's Office - Information Support Sheriff's Office - Law Enforcement	1	6	6	7	5	3	7	1	1	1	1
Sheriff's Office - Operations					1	2	1			-	
TNR - Parks	1	1	1	18	3		21	1	1		
TNR - Planning & Engineering					3		3			1	1
TNR - Road Maintenance	1	1	1	7	6		13	1	1		
OTHER AGENCIES/ENTITIES  ACC - Police										-	
AISD - Police	1	1	1	4	2		4	1	1	-	
AISD - Service Center	1	1	1	1		20	1	1	1	1	1
AISD - Transportation				4		8	4				
Austin Diagnostic Medical Center				2		3	2				
Austin Heart Hospital				2		2	2				
Capital Area Planning Council - 911 Center Capital Metropolitan Transportation Authority - Operations & Vehicle	1	6	6	12			12	1	1		
Maintenance	1	6	6		6		6	1	1	1	1
Columbia-Round Rock Community Hospital	•	Ü	U	2	U	1	2	-	1	1	1
Columbia-St. David's Hospital				2		3	2				
Pflugerville - Police and Public Works Departments	1	2	2	5			5	1	1		
Seton Hospital Seton-Brackenridge Hospital				2		3	2				
Seton-Brackenridge Hospital Seton-Northwest Hospital				2		6	2			-	
South Austin Community Hospital			- 1	2		3	2				
State of Texas - Legislative Council	100			1		7	1				
Texas Department of Transportation - Austin District											
Texas House of Representatives				3		2	3				
Travis County Fire Fighter's Association University of Texas - Police and Operations Departments				20			20				
West Lake Hills - Police Department	1	1	1		30		30	1	1	1	1
		1	1		cocamand.		Charles CV	23	23		

2.						Con	soles (	cont.)				
	AEMS Call Taker console	AEMS Combination Operations/Tactial console	AEMS Supervisor console	AEMS Communication Manager's console	TCSO Dispatcher console	TCSO Supervisor console	TNR Call Taker console	TNR Combination Call Taker/Dispatcher console	TNR Supervisor console	Capital METRO Dispatcher console	Capital METRO Supervisor console	Pflugerville Combination Call Taker/Dispatcher console
CITY OF AUSTIN	AE	A P	AE	A A	5	5	F	Y E	F	28	2 8	E 0 8
CITY OF AUSTIN Austin Energy												
Aviation Operations												
Aviation Police												
City Hall												
Convention Center												
Development, Review & Inspection  Emergency Medical Services		-		-				-			-	
Fire Department												
Fleet Services												
Health & Human Services												
Information Systems												
Library Municipal Court - City Marshall's Office			-				-	-		_		
OEM - Emergency Conference Network			$\neg$								-	
OEM - Industry & Broadcast Media Network					1 1							
Office of Emergency Management												
Parks & Recreation - Operations												
Parks & Recreation - Police Police Department												
Public Information Office		-	-				$\rightarrow$	_	-	_		
Public Works & Transportation - Construction Management												
Public Works & Transportation - Street and Bridge												
Public Works & Transportation - Transportation												
Radio Communications												
Solid Waste Services Storm Water & Drainage Utility												
Utility Customer Services												
Water & Wastewater												
TRAVIS COUNTY												
Constable - Precinct 1												
Constable - Precinct 2 Constable - Precinct 3				4								
Constable - Precinct 3  Constable - Precinct 4			-				-					
Constable - Precinct 5												
County Attorney's Office												
District Attorney's Office												
Elections												
Emergency Management Services Facilities Management	-	$\rightarrow$	$\rightarrow$				-					
Health Services					_							
Information & Telecommunications Systems												
Juvenile Court												
Medical Examiner's Office												
Sheriff's Office - Information Support Sheriff's Office - Law Enforcement		-	_		-		-			_	_	
Sheriff's Office - Operations											-	
TNR - Parks												
TNR - Planning & Engineering							1					
TNR - Road Maintenance												
OTHER AGENCIES/ENTITIES  ACC - Police												
AISD - Police									-	_	-	
AISD - Service Center												
AISD - Transportation												
Austin Diagnostic Medical Center												
Austin Heart Hospital												
Capital Area Planning Council - 911 Center  Capital Metropolitan Transportation Authority - Operations & Vehicle			-			-	-		-	-		
Maintenance									4			
Columbia-Round Rock Community Hospital												
Columbia-St. David's Hospital												
Pflugerville - Police and Public Works Departments												
Seton Hospital Seton-Brackenridge Hospital												
Seton-Brackenridge Hospital Seton-Northwest Hospital			$\rightarrow$		-		-		-			
South Austin Community Hospital				-								
State of Texas - Legislative Council												
Texas Department of Transportation - Austin District												
Texas House of Representatives						1						
Travis County Fire Fighter's Association		-										
University of Tayes - Police and Operations Departments												
University of Texas - Police and Operations Departments  West Lake Hills - Police Department	-	-	-								-	

					С	onsoles					
	APD Call Taker console	APD Call Taker Training console	APD Call Taker Supervisor console	APD Dispatcher Primary console	APD Dispatcher Information console	APD Dispatcher Tactical console	APD Dispatcher Training console	APD Dispatcher Supervisor console	AFD Call Taker console	AFD Combination Call- Taker/Dispatcher console	AFD Supervisor console
CITY OF AUSTIN	₹	₹ 8	₹ 8	₹ 8	< <u>−</u>	₹ 8	∢ δ	₹ 8	⋖.	∢ ⊢	< <
Austin Energy											
Aviation Operations				1							
Aviation Police											
City Hall											
Convention Center Development, Review & Inspection											
Emergency Medical Services											
Fire Department											
Fleet Services											
Health & Human Services											
nformation Systems Library											
Municipal Court - City Marshall's Office											
DEM - Emergency Conference Network							- 1				
DEM - Industry & Broadcast Media Network										(===3)	
Office of Emergency Management											
Parks & Recreation - Operations Parks & Recreation - Police											
Police Department	40	4	1	14	2	3	2	1			
Public Information Office	40	7	1	14	-	3		1			
Public Works & Transportation - Construction Management	1 20										
Public Works & Transportation - Street and Bridge											
Public Works & Transportation - Transportation											
Radio Communications Solid Waste Services											
Storm Water & Drainage Utility	-						-				
Utility Customer Services											
Water & Wastewater											
TRAVIS COUNTY											
Constable - Precinct 1											
Constable - Precinct 2 Constable - Precinct 3											
Constable - Precinct 4											
Constable - Precinct 5											
County Attorney's Office											
District Attorney's Office					1						
Elections Emergency Management Services											-
Facilities Management						-					
Health Services											
nformation & Telecommunications Systems											
Juvenile Court											-
Medical Examiner's Office											
Sheriff's Office - Information Support Sheriff's Office - Law Enforcement											
Sheriff's Office - Operations											
TNR - Parks											
TNR - Planning & Engineering											
TNR - Road Maintenance											
OTHER AGENCIES/ENTITIES ACC - Police											
AISD - Police											
AISD - Service Center											
AISD - Transportation											
Austin Diagnostic Medical Center											
Austin Heart Hospital							1				
Capital Area Planning Council - 911 Center Capital Metropolitan Transportation Authority - Operations & Vehicle											
Capital Metropolitan Transportation Authority - Operations & Vehicle  Maintenance											
Columbia-Round Rock Community Hospital											
Columbia-St. David's Hospital											
Pflugerville - Police and Public Works Departments											
Seton Hospital											
Seton-Brackenridge Hospital Seton-Northwest Hospital											
South Austin Community Hospital											
State of Texas - Legislative Council											
Texas Department of Transportation - Austin District											1
Texas Department of Transportation - Austin District Texas House of Representatives											
Texas Department of Transportation - Austin District Texas House of Representatives Travis County Fire Fighter's Association											
Texas Department of Transportation - Austin District Texas House of Representatives											

City of Austin Request for Proposal No. RFP VC98300024 Issued on 6/22/98

## SECTION 18.0

#### 18.0 EXHIBITS

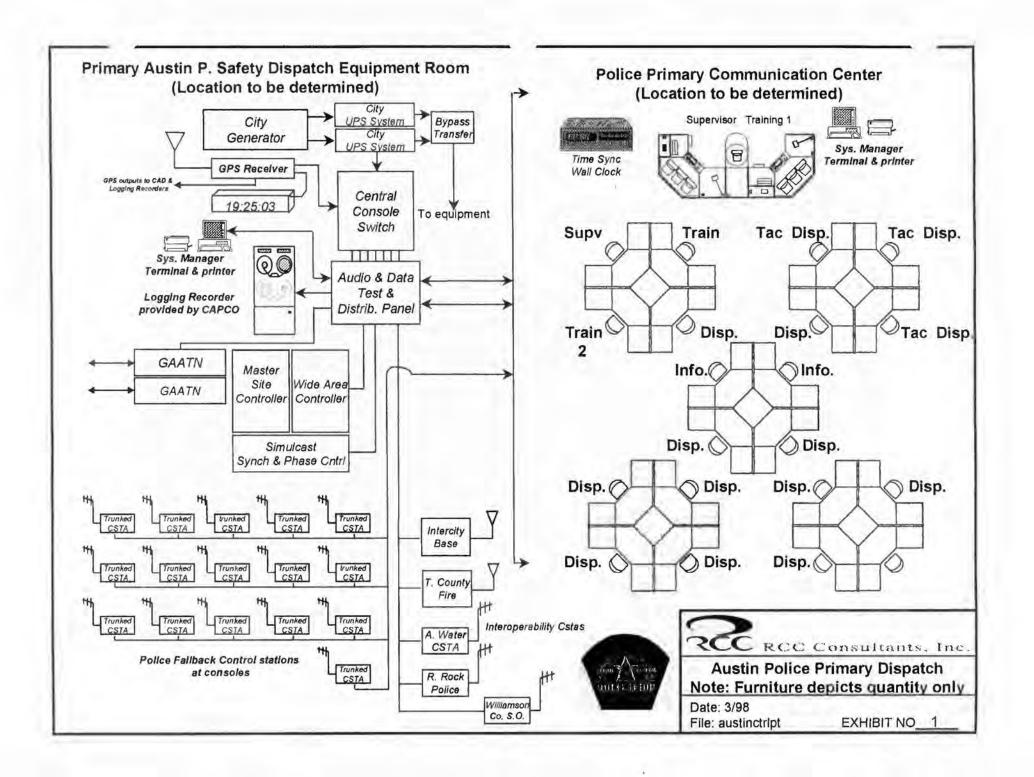
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#### City of Austin Request for Proposal No. RFP VC98300024 Issued on 6/22/98

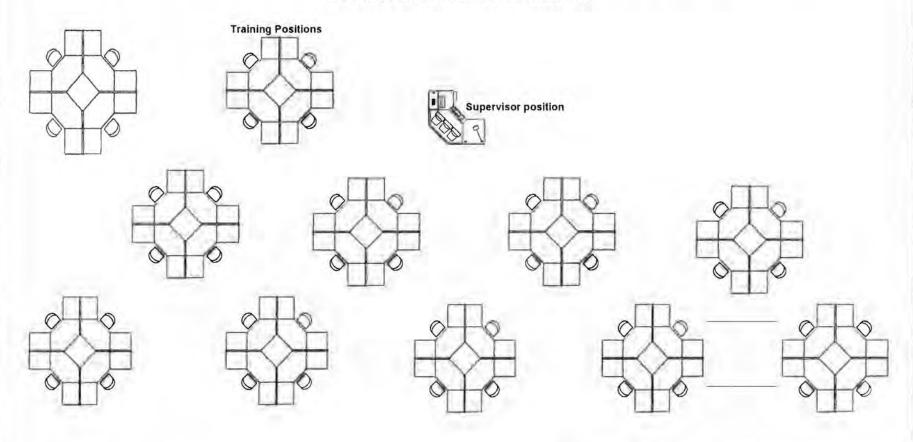
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#### Austin Police Call Taker Positions at Primary Dispatch Center

(Depicts No. of positions, not furniture configuration)

Location to be determined



#### Positions by function:

- 40 Call takers
- 4 Training positions
- 1 Supervisory position





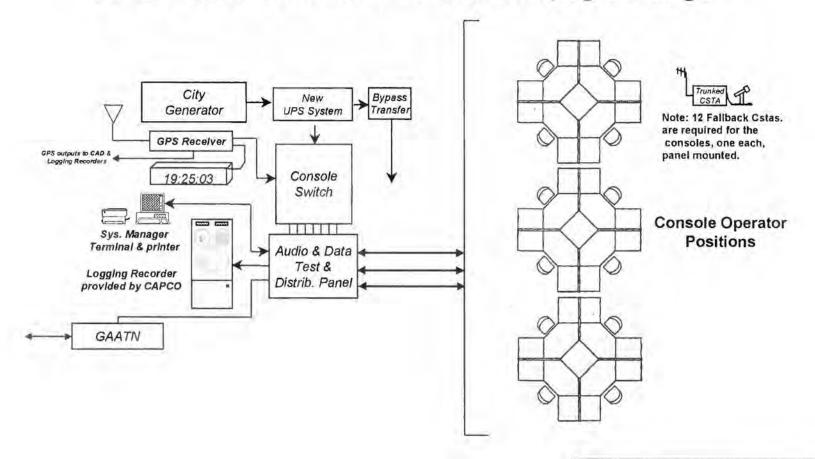
RCC RCC Consultants. Inc.

**Austin Police Call Takers** 

Date: 3/98

File: austinctrlpt

#### Austin Police Department Backup Dispatch Facilities A.P.D. North Substation - 12425 Lamplight Village



Notes: 1. All 12 consoles shall be same make & model (CRT based) as those provided for the primary dispatch center. Same functionality shall be provided. New UPS required. 2. 12 fallback cstas, required.





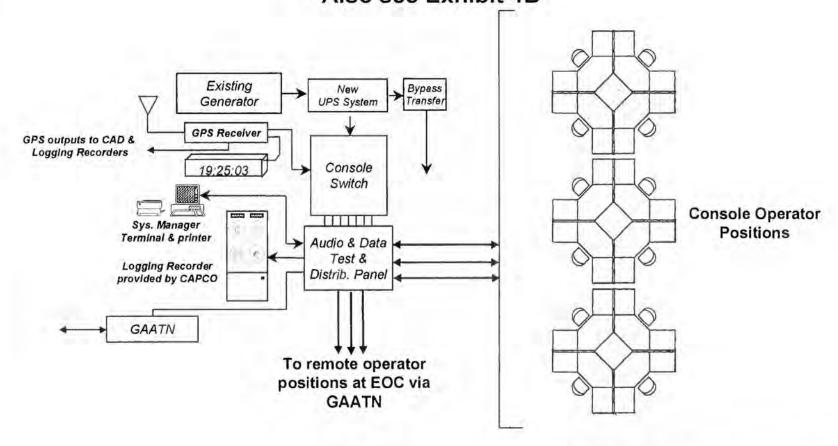
RCC RCC Consultants, Inc.

Austin Police Backup Dispatch

Date: 3/98

File: austinctrlpt

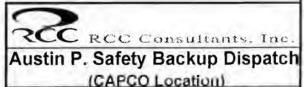
## Austin Public Safety Backup Dispatch Facilities (CAPCO Location) Also see Exhibit 4B



<u>Notes:</u> 1. All 12 consoles shall be same make & model (CRT based) as those provided for the primary dispatch center. Same functionality shall be provided.

2. New UPS required. These consoles will support Police, Fire, & EMS.



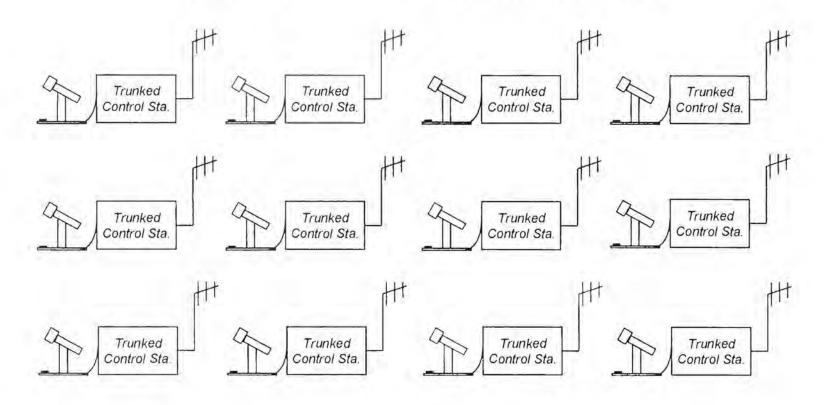


Date: 3/98

File: austinctrlpt

EXHIBIT NO 4A

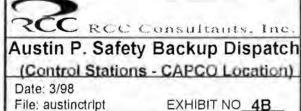
### **Austin Public Safety Backup Dispatch Facilities** (Control Stations for CAPCO Location)



Notes: 1. Control stations shall be equipped with a 4 hour rechargeable power system,

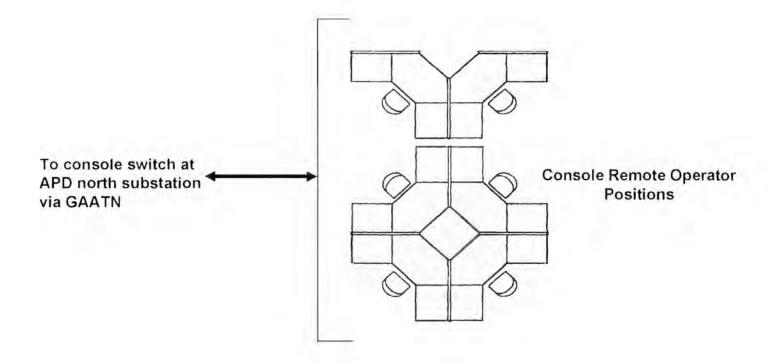
- 2. Total for this exhibit = 12
- 3. Need to know if encryption is needed on Csta's.





File: austinctrlpt

### **Emergency Operations Center Dispatch Facilities**



**Notes: 1.** All 6 consoles shall be same make & model (CRT based) as those provided for the consolidated dispatch center. Same functionality shall be provided. New UPS required.

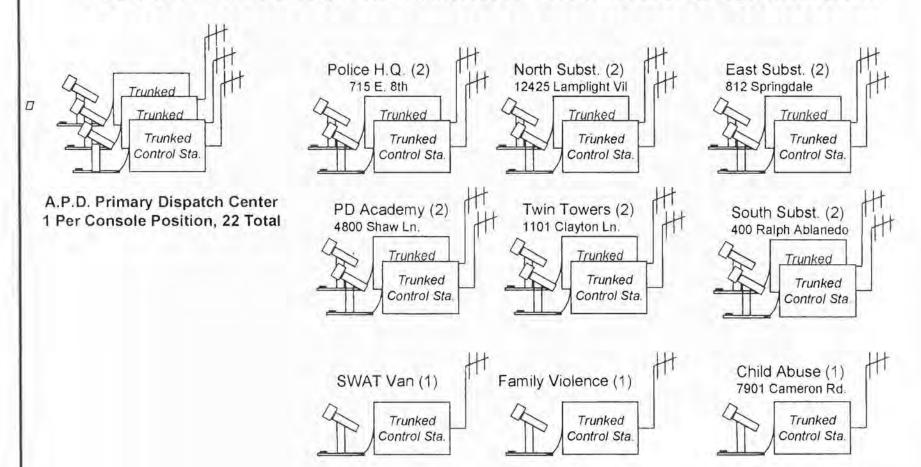


E.O.C. Dispatch Consoles

Date: 3/98

File: austinctrlpt

#### **Austin Police Control Station Locations & Quantities**



<u>Notes:</u> 1. Control stations shall be equipped with a 4 hour rechargeable power system, except SWAT van. Csta's shall provide encrypted operation.

2. Total for this exhibit = 37



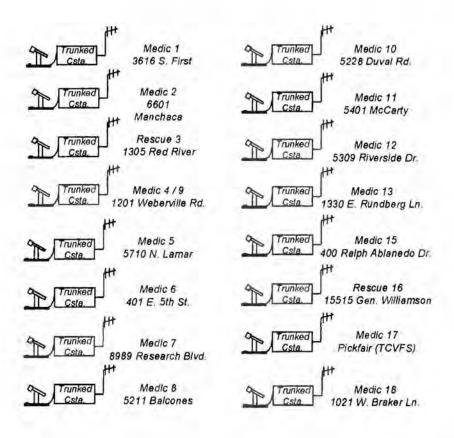


A.P.D. Control Points

Date: 3/98

File: austinctrlpt

### Austin E.M.S. Station Control Points



Notes: 1. Fire & EMS control stations shall be equipped w/ a decoder for all call, group call, individual call, capable of supporting their existing elerting scheme, relay outputs for station lights, open doors, & PA system. All shall have 4 hour rechargeable power supply.

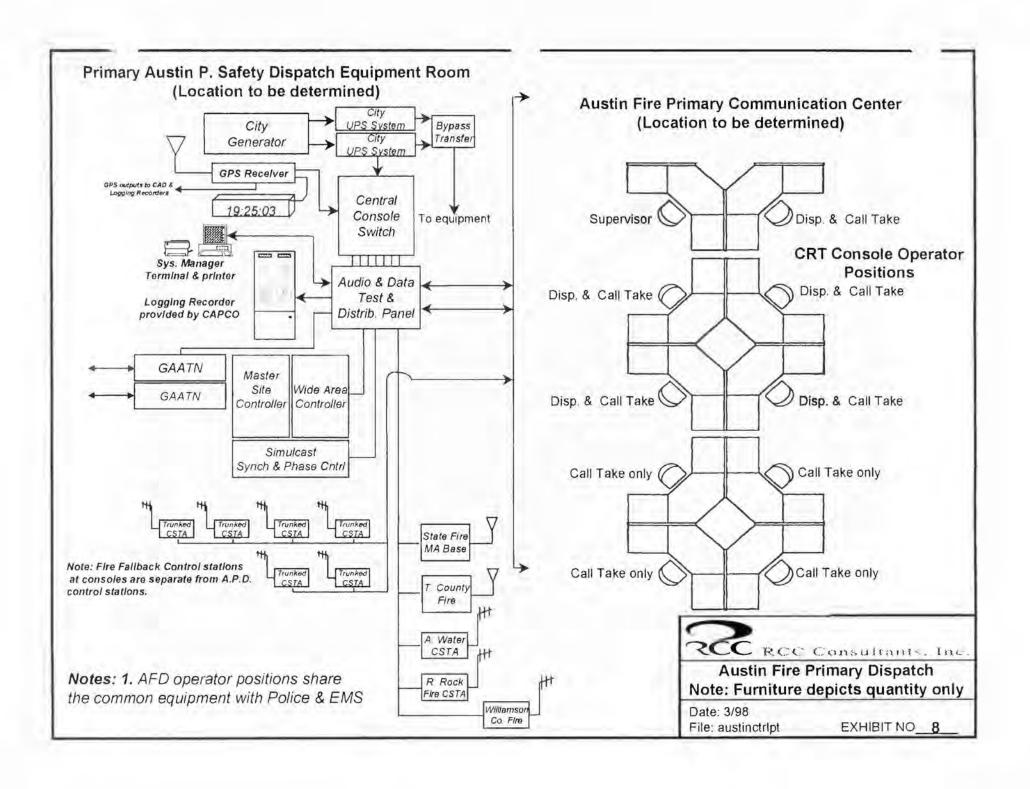


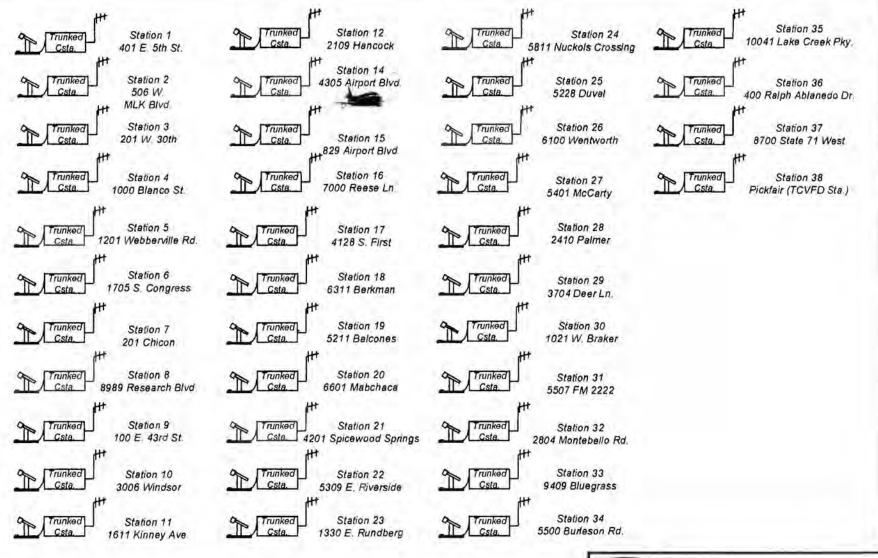
RCC Consultants, Inc.

Austin E.M.S. Station Control Points

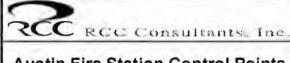
Date: 3/98

File: austinctrlpt





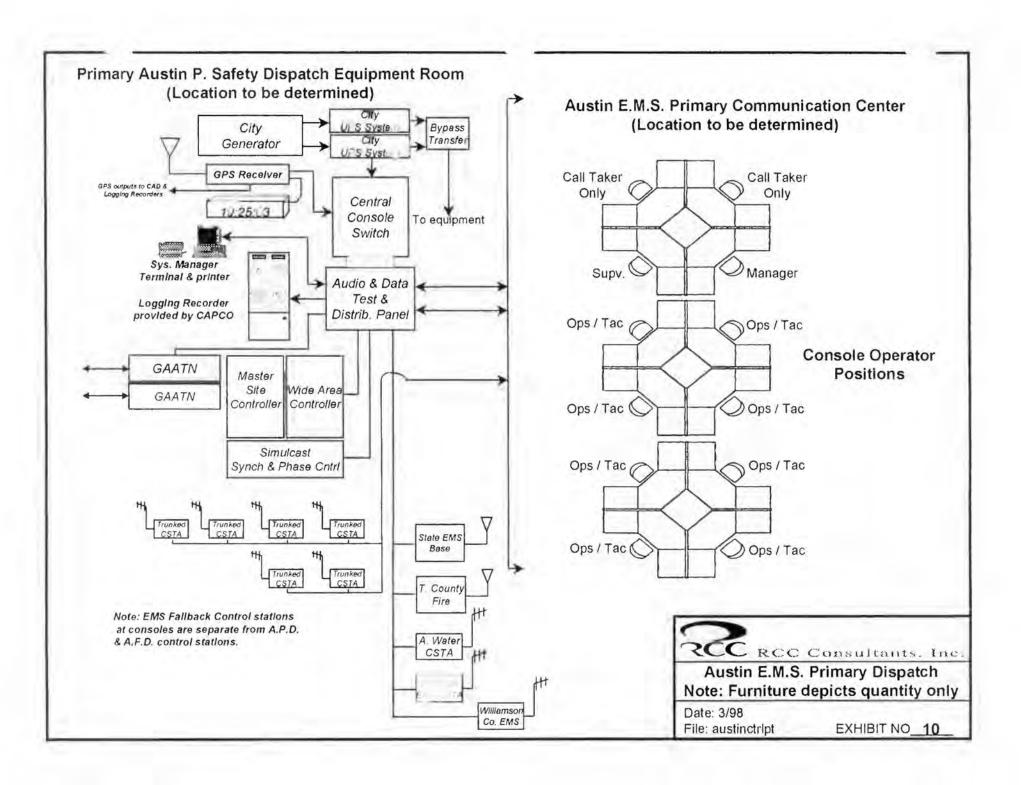
Notes: 1. Fire & EMS control stations shall be equipped w/ a decoder for all call, group call, individual call, relay outputs for station lights, open doors & PA system. All shall have 4 hour rechargeable power supply.



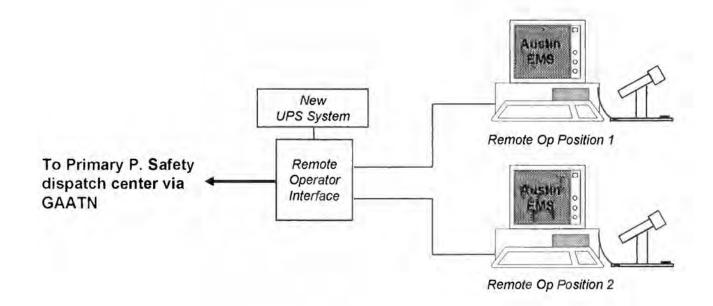
Austin Fire Station Control Points

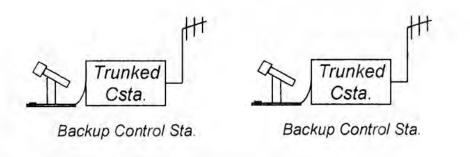
Date: 3/98

File: austinctript



## Austin E.M.S. Remote Console Operator Positions (Rebecca Baines Johnson Building)





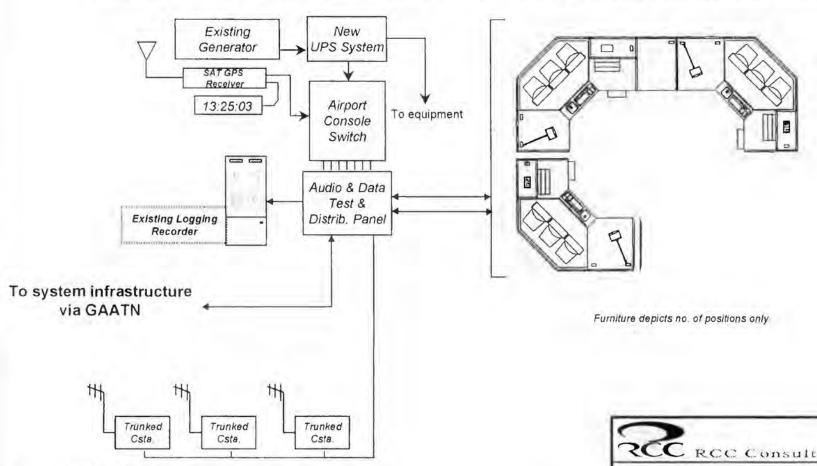


#### **Austin Bergstrom International Airport Police** 3600 Presidential Blvd.

Option 1 - New CRT based Consoles & Wireline Interface

Mueller International Airport Equipment Room

**Existing Airport Police Communication Center** 



Notes: 1. Fallback control stations at consoles also wired to console switch to allow console selection & recording. Control stations shall include 4 hour rechargeable power system.

See equipment list for total number of control stations required.



Austin Bergstrom Int. Airport

Date: 3/98

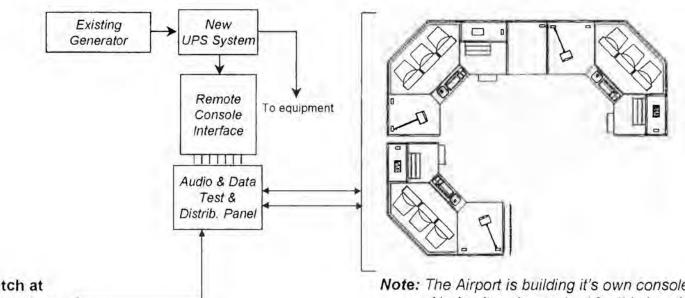
File: austinctrlpt

### Austin Bergstrom International Airport Police 3600 Presidential Blvd.

Option 2 - New CRT based Remote Consoles

Mueller International Airport Equipment Room

**Existing Airport Police Communication Center** 

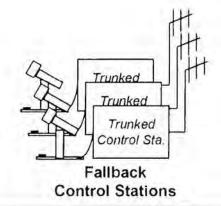


To console switch at APD North Substation via GAATN

**Note:** The Airport is building it's own console furniture No furniture is required for this location.

Notes: 1. Fallback control stations at consoles equipped with 4 hour rechargeable power system.

2. See equipment list for total number of control stations required.



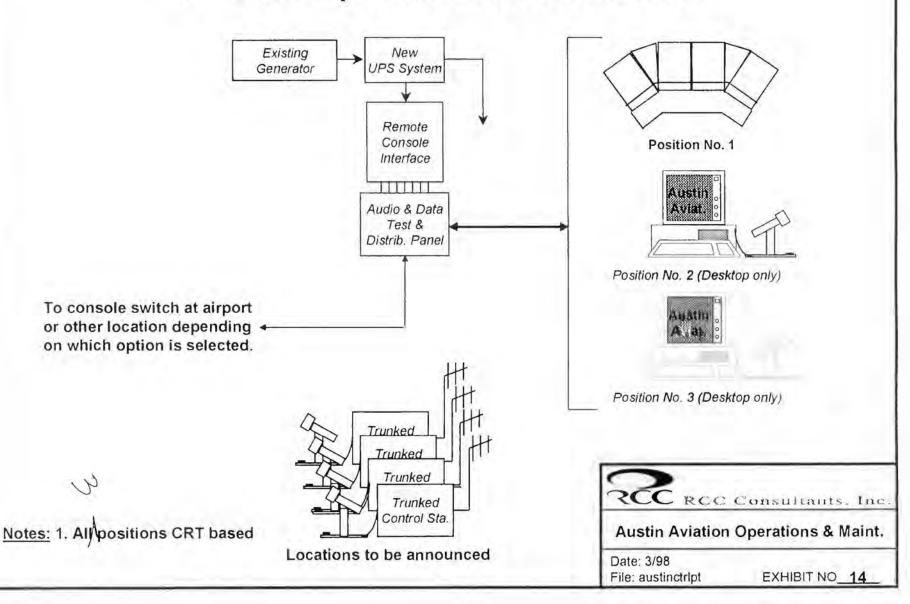


Austin Bergstrom Int. Airport

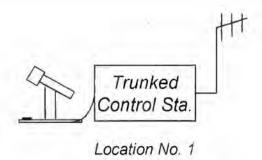
Date: 3/98

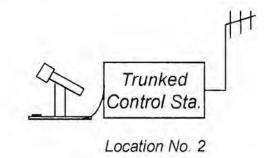
File: austinctrlpt

### City of Austin Aviation Operations & Maintenance



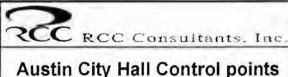
### **City of Austin** City Hall (Administration) Control Points





Notes: 1. Control stations shall be equipped with a 4 hour rechargeable power system.

2. Antennas can be concealed & mounted indoors



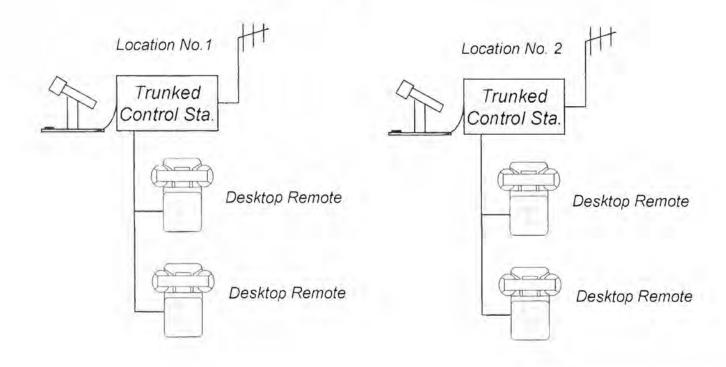
**Austin City Hall Control points** 

Date: 3/98

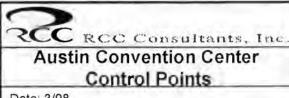
File: austinctrlpt

### City of Austin **Convention Center**

(201 E. 2nd St.)



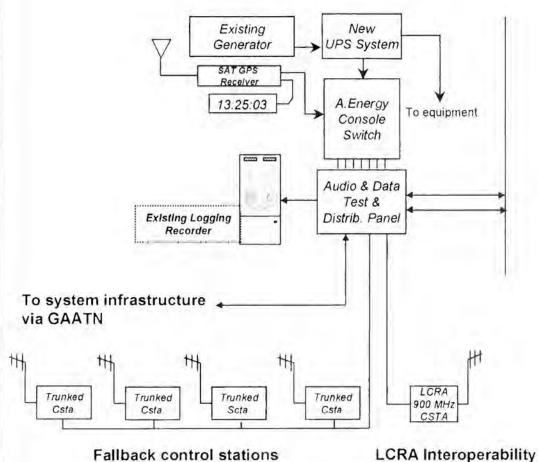
Notes: 1. Control stations shall be equipped with a 4 hour rechargeable power system.

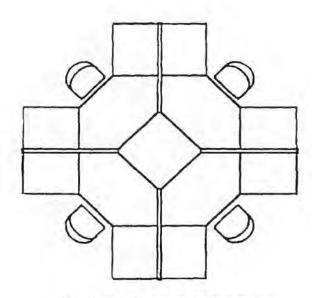


Date: 3/98

File: austinctrlpt

#### City of Austin **Austin Energy Primary Control Point - Option 1** ECC - 301 West Avenue





CRT based operator positions



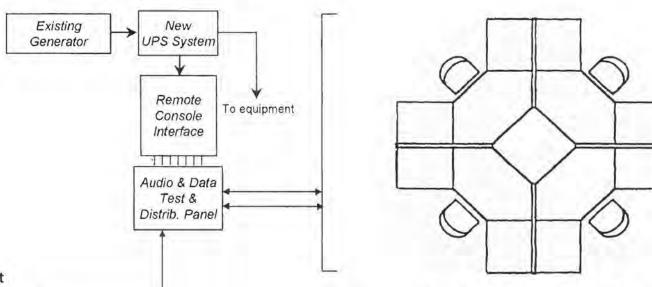
RCC RCC Consultants, Inc.

Austin Energy Primary Control Pt.

Date: 3/98

File: austinctrlpt

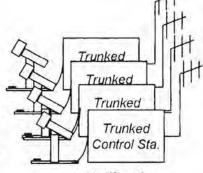
## City of Austin Austin Energy Primary Control Point - Option 2 ECC - 301 West Avenue



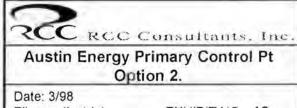
To console switch at Primary P. Safety communication center via GAATN

<u>Notes:</u> 1. Fallback control stations at consoles equipped with 4 hour rechargeable power system.

2. See equipment list for total number of control stations required.

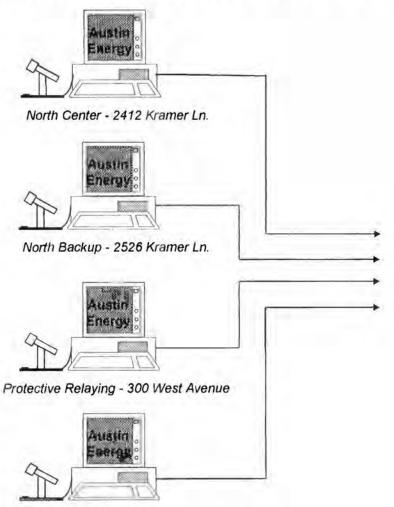


Fallback Control Stations (4) CRT based operator positions



File: austinctrlpt

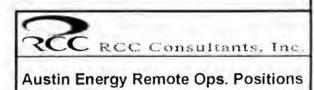
## City of Austin Austin Energy CRT Based Remote Consoles



To console switch

South Center - 4411 Meinardis Rd.

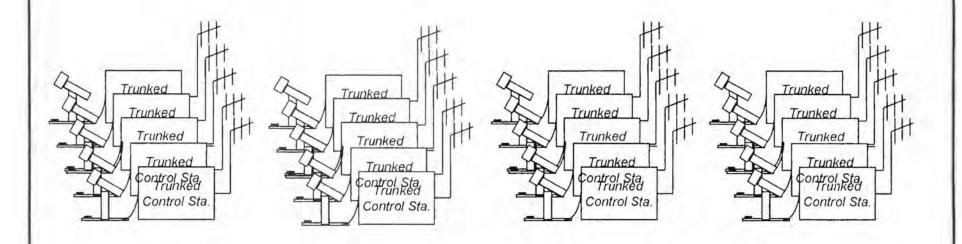
Notes: 1. Operator positions to include 30 minute UPS
2. Op positions shall provide same functionality as primary consoles



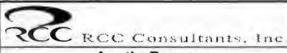
Date: 3/98

File: austinctrlpt

### **City of Austin Austin Energy Control Stations (20)**



Notes: 1. Locations for installation of control stations to be announced

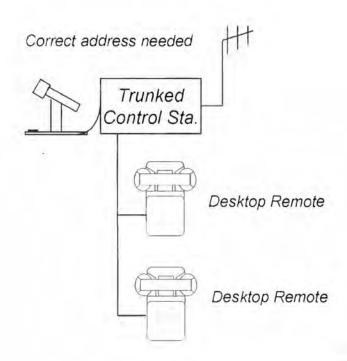


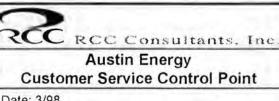
**Austin Energy Control Station Locations** 

Date: 3/98

File: austinctrlpt

### City of Austin **Austin Energy Customer Service Control Point**

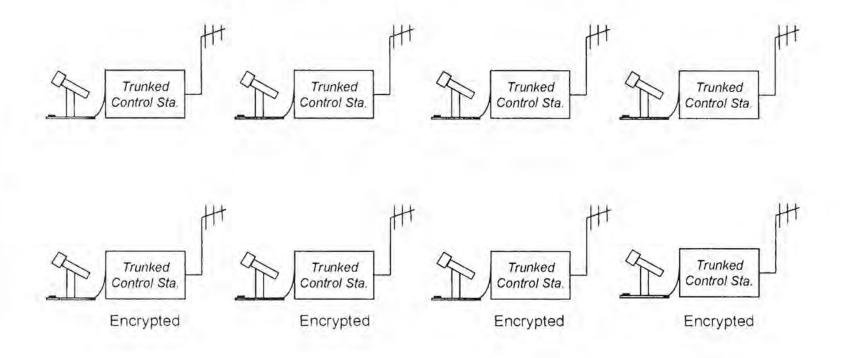




Date: 3/98

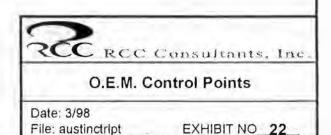
File: austinctrlpt

# City of Austin Office of Emergency Management Control Points 124 W. 8th Street (City Hall) - Room 107

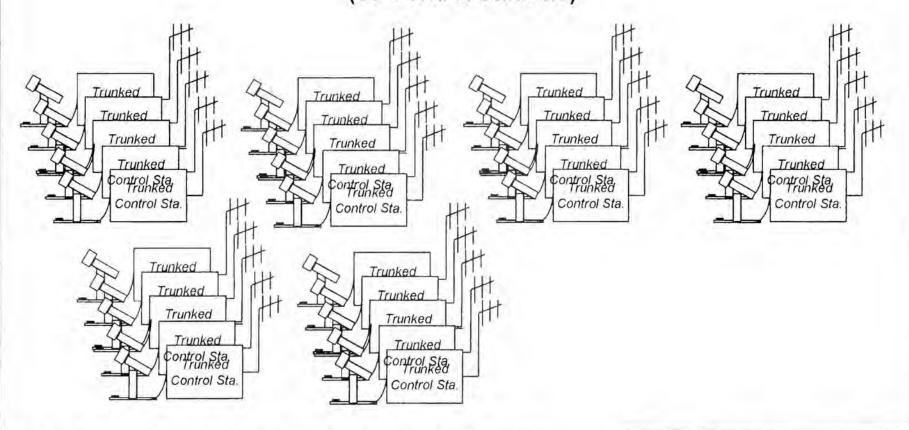


Notes: 1. EOC may be relocated to the new consolidated communication center or new City Hall in the future.

2. Control stations shall be equipped with a 4 hour rechargeable power system.



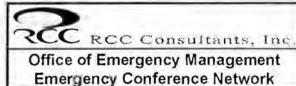
## City of Austin O.E.M. Emergency Conference Network (30 Control stations)



Notes: 1. Tentative breakdown includes 10 for City agencies, 7 for Hospitals, 3 for County & Area Govts., 10 for private industry (seperately funded).

2. Radios shall include "call alert" type capability to unmute the radio & sound an alert. Designated mobiles & portables should be able to alert these radios.

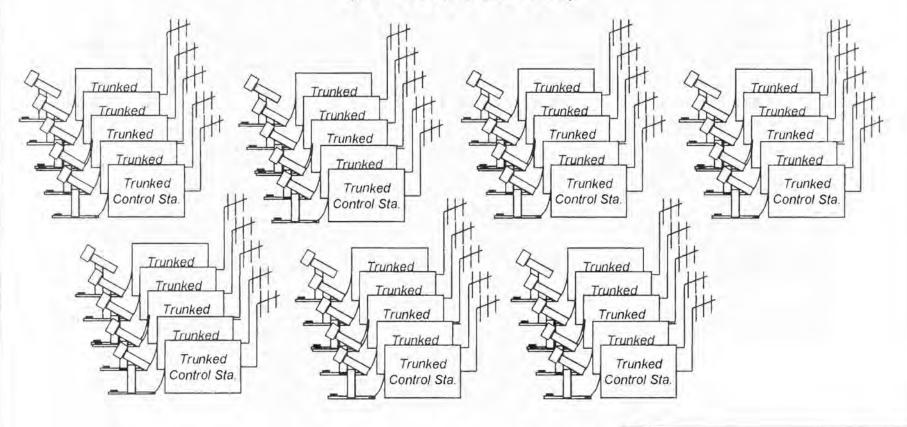
3. OEM shall determine if these radios are already included in agencies counts.



Date: 3/98

File: austinctrlpt

## City of Austin O.E.M. Industry & Broadcast Media Network (35 Control stations)



Notes: 1. All radios in this group to be privately funded, no governmental funds shall be used for these radios.

2. This network to be controlled by O.E.M.



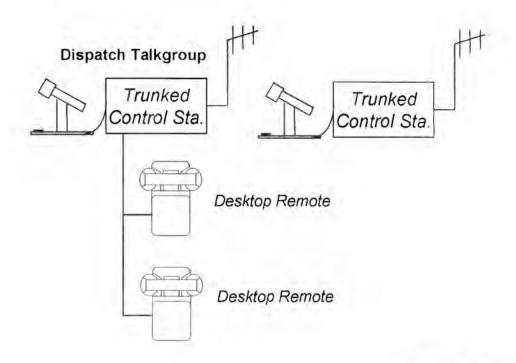
C RCC Consultants, Inc.

Office of Emergency Management Industry & Broadcast Media Network

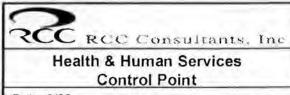
Date: 3/98

File: austinctrlpt

# City of Austin Health & Human Services Department Control Point (Animal Control Facility - 1156 West First St.)



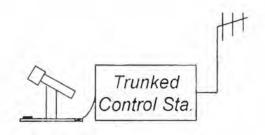
Note: Information from H & HS was unclear, we were unsure if H&HS needs an additional dispatch point at another location. Please clarify.

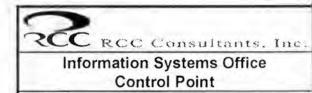


Date: 3/98

File: austinctrlpt

### City of Austin Information Systems Office (625 East 10th Street, Suite 900)



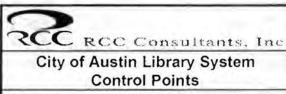


Date: 3/98

File: austinctrlpt

### City of Austin Library System

The Library Department has not requested any control stations.



Date: 3/98

File: austinctrlpt

### City of Austin Municipal Court - Marshal's Office

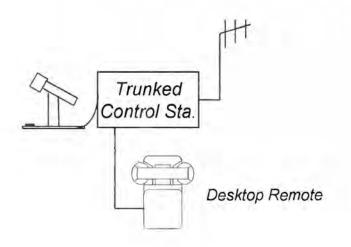
The Marshal's Office has not requested any control stations.



Date: 3/98

File: austinctrlpt

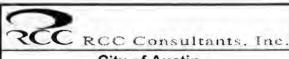
# City of Austin Parks & Recreation Operations Control Point (901 West Riverside)





To console switch via GAATN

CRT based remote operator position providing full functionality including unit ID & Emergency ID for PARD units

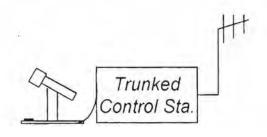


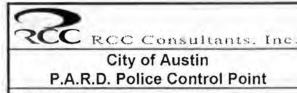
City of Austin P.A.R.D. Control Point

Date: 3/98

File: austinctrlpt

# City of Austin Parks & Recreation Police Department Control Point (901 West Riverside)

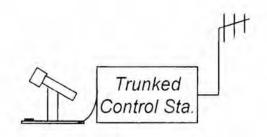


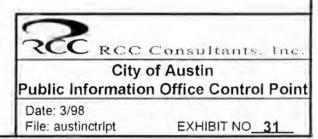


Date: 3/98

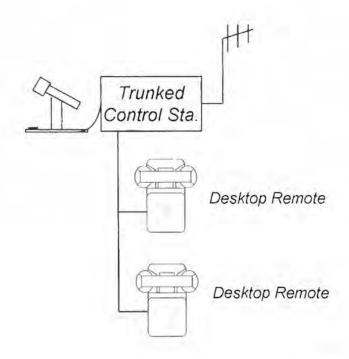
File: austinctrlpt

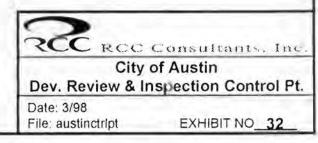
### City of Austin Public Information Office Control Point



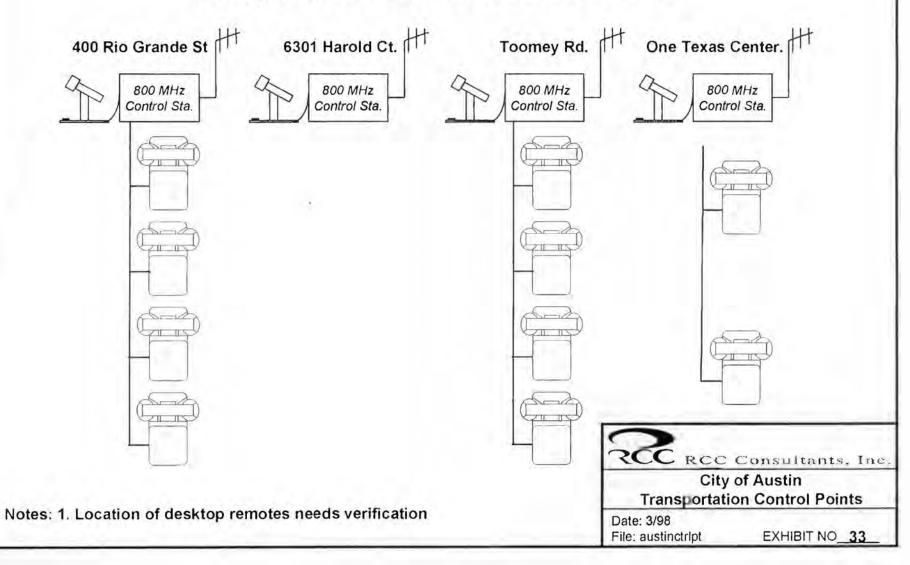


### City of Austin Development Review & Inspection Control Point

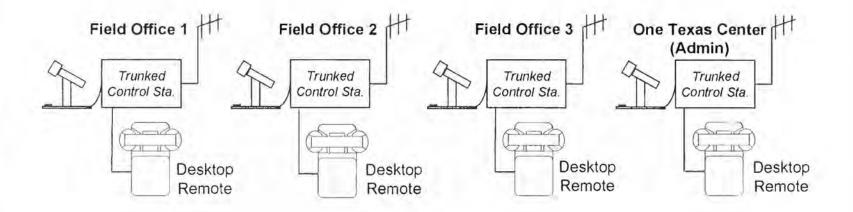


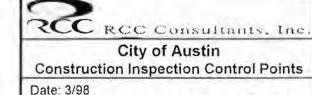


# City of Austin Public Works & Transportation Department Transportation Division Control Points



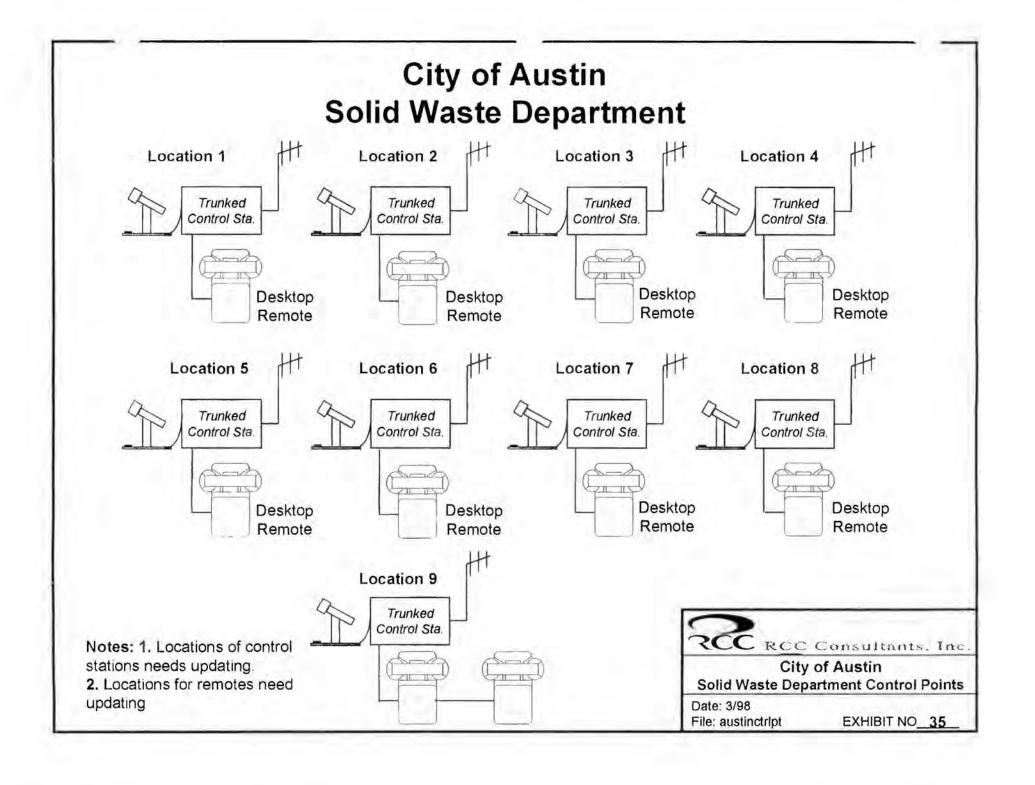
# City of Austin Public Works & Transportation Department Construction Inspection Division



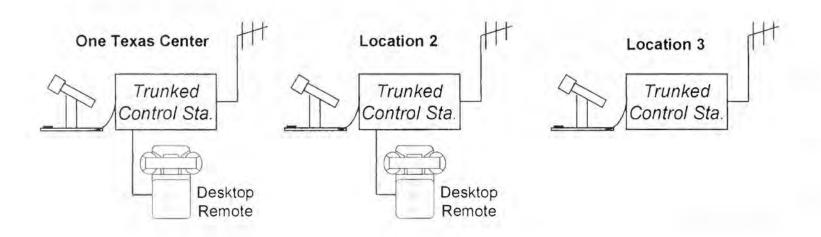


Notes: 1. Location of desktop remotes needs verification

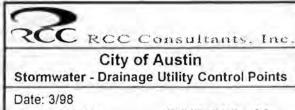
File: austinctrlpt EXHIBIT NO 34



### **City of Austin Stormwater Management - Drainage Utility**

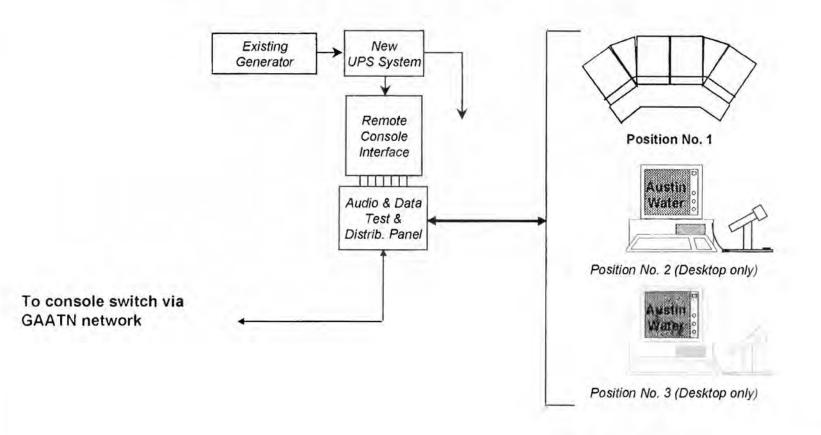


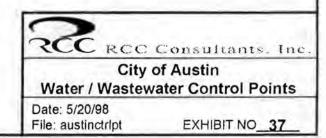
Notes: 1. Locations of control stations & remotes needs updating



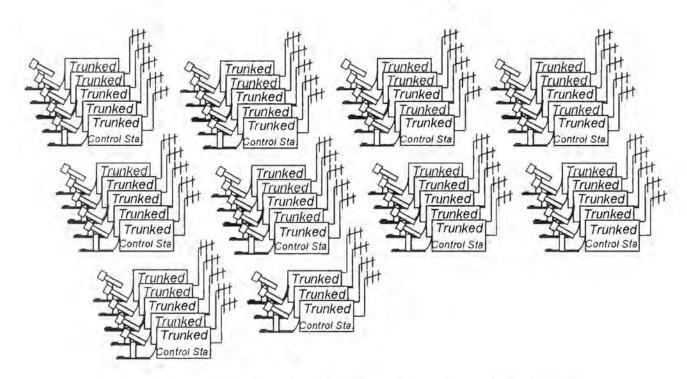
File: austinctrlpt

## City of Austin Water / Wastewater Department





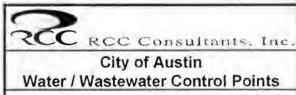
## City of Austin Water / Wastewater Department



48 control stations required 10 Desktop remotes required

Desktop Remote

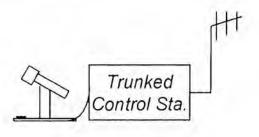
Notes: 1. Locations of control stations & remotes needed.

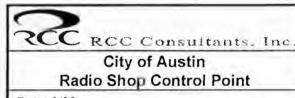


Date: 5/20/98

File: austinctrlpt

# City of Austin Radio Communications Shop Control Point (1006 Smith Rd.)

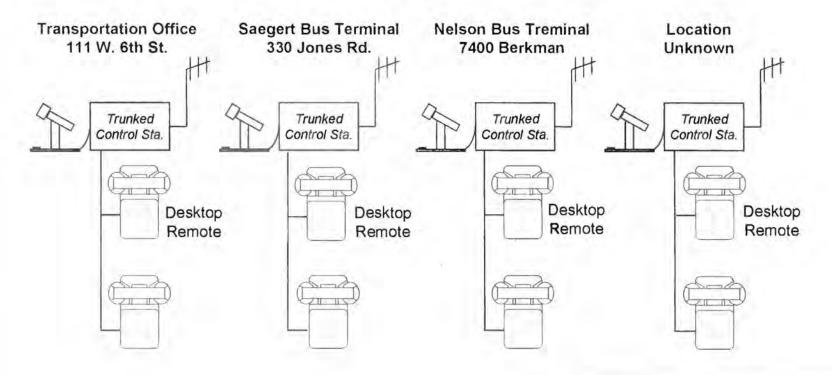


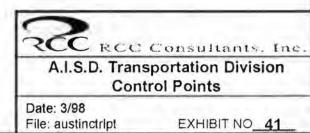


Date: 3/98

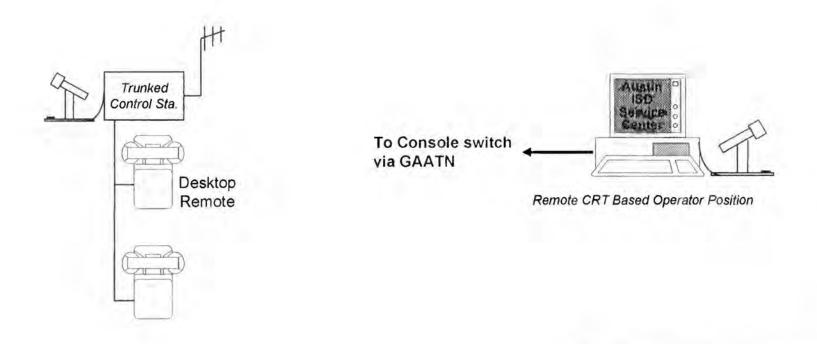
File: austinctrlpt

# City of Austin Austin Independent School District Transportation Division





## City of Austin Austin Independent School District Service Center



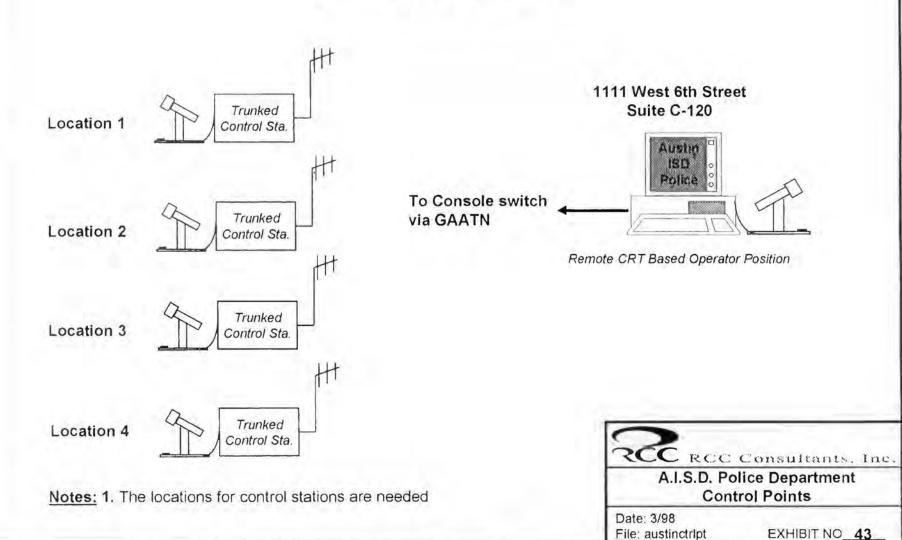
Notes: 1. The Service Center requested 20 desktop remotes, we need to know where they will go. One control station cannot drive 20 remotes, more control stations may be needed.



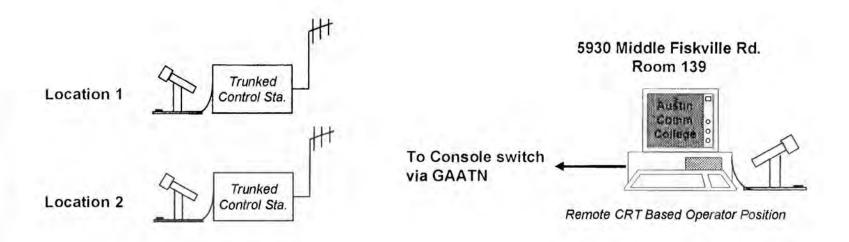
Date: 3/98

File: austinctrlpt

## City of Austin Austin Independent School District Police Department



### Austin Community College Police Department



Notes: 1. The locations for control stations are needed

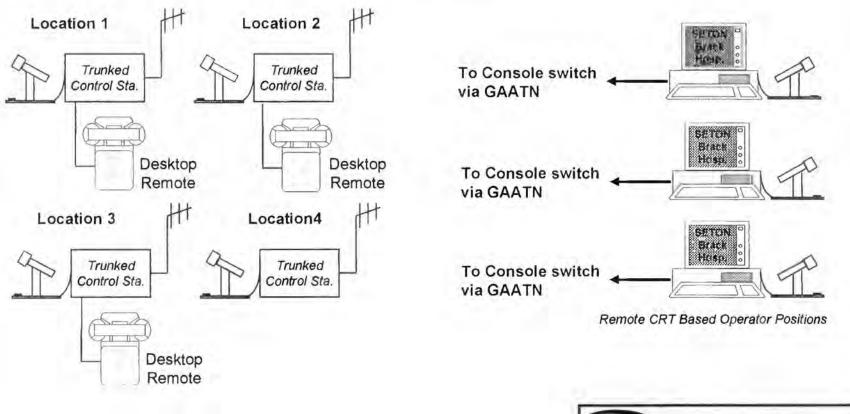


Date: 3/98

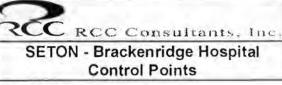
File: austinctrlpt

### SETON - Brackenridge Hospital Control Points

(601 E. 15th St.)



Notes: 1. The locations for control stations, consoles, & Remotes are needed

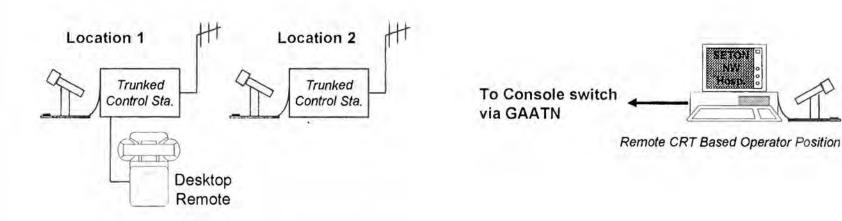


Date: 3/98

File: austinctrlpt

### SETON Northwest Hospital Control Points

(11113 Research Blvd.)



Notes: 1. The locations for control stations, the console, & Remote are needed

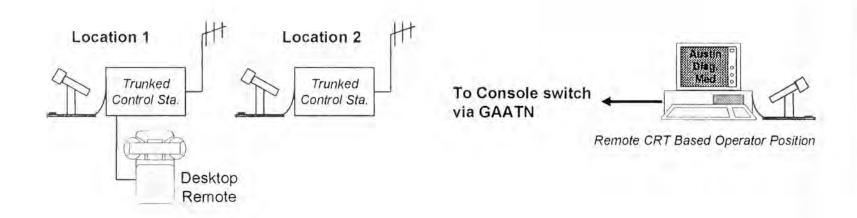


Date: 3/98

File: austinctrlpt

#### Austin Diagnostic Medical Center Control Points

(12221 N. MoPac Expressway)



Notes: 1. The locations for control stations, the console, & Remote are needed

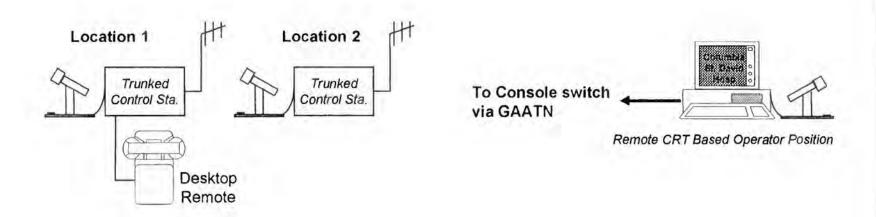


Date: 3/98

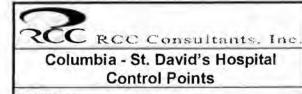
File: austinctrlpt

#### Columbia - St. David's Hospital Control Points

(919 E. 32nd. St.)



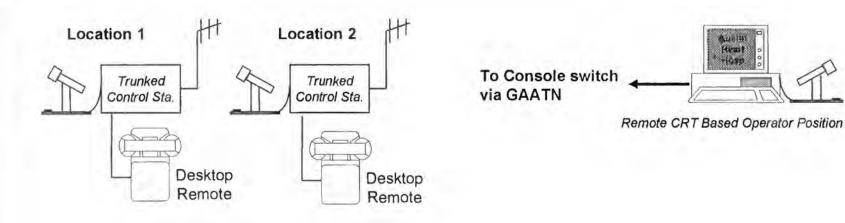
Notes: 1. The locations for control stations, the console, & Remote are needed



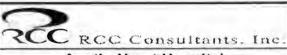
Date: 3/98

File: austinctript

#### Austin Heart Hospital Control Points



Notes: 1. The locations for control stations, the console, & Remotes are needed

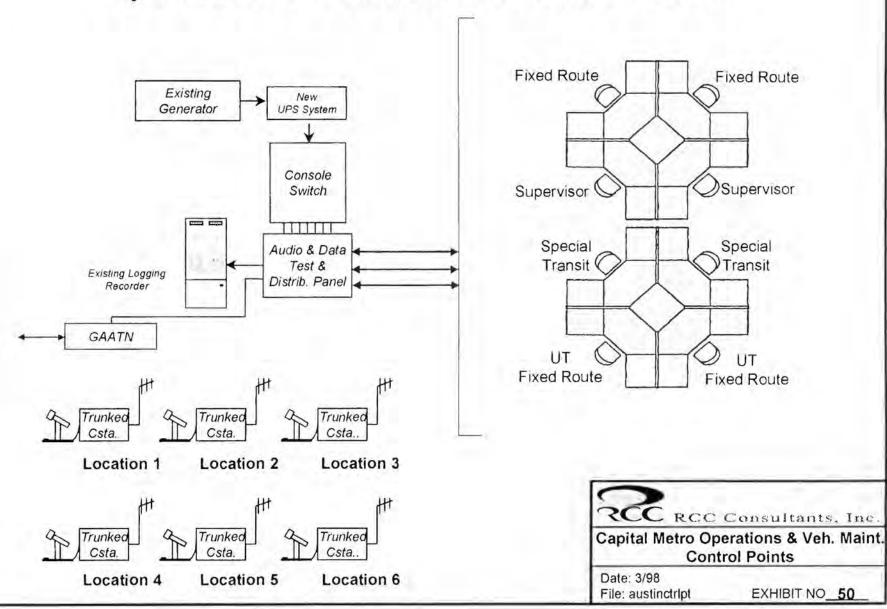


Austin Heart Hospital Control Points

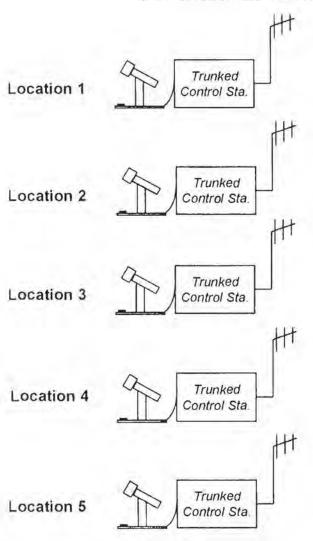
Date: 3/98

File: austinctrlpt

### Capital Metro Operation & Vehicle Maintenance Division



### City of Pflugerville Police & Public Works Control Points



Notes: 1. Need locations for control stations

100 East Main St.



To console switch via GAATN Network

CRT Remote Operator Position No. 1 (Desktop only)



CRT Remote operator Position No. 2 (Desktop only)

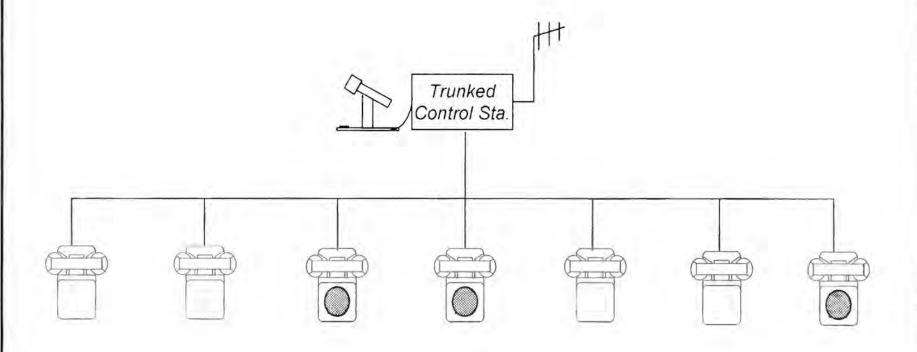


Control Points

Date: 3/98

File: austinctrlpt

### Texas House of Representatives Control Points



**Notes: 1.** Note that only one talkgroup at a time can be accessed by the single control station. All 7 remotes operate on the same talkgroup at any moment in time. More control stations may be needed. Verify.



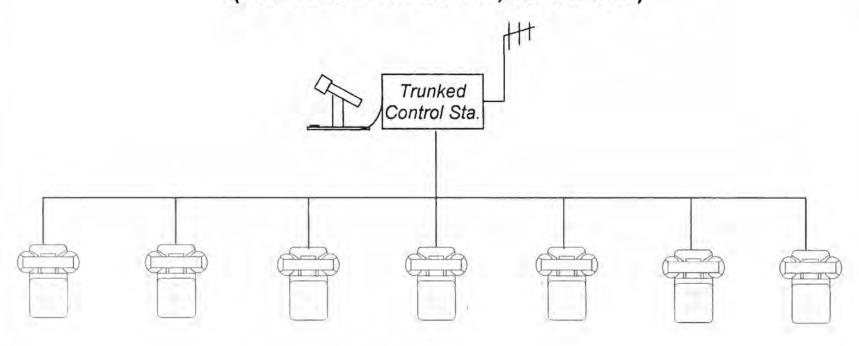
RCC RCC Consultants. Inc.

Texas House of Representatives
Control Points

Date: 3/98

File: austinctrlpt

#### State of Texas Legislative Council Control Points (105 West 15th Street, Room 515)



**Notes: 1.** Note that only one talkgroup at a time can be accessed by the single control station. All 7 remotes operate on the same talkgroup at any moment in time. More control stations may be needed. Verify.



RCC RCC Consultants, Inc.

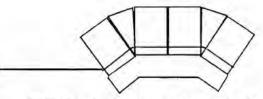
State of Texas Legislative Council Control Points

Date: 3/98

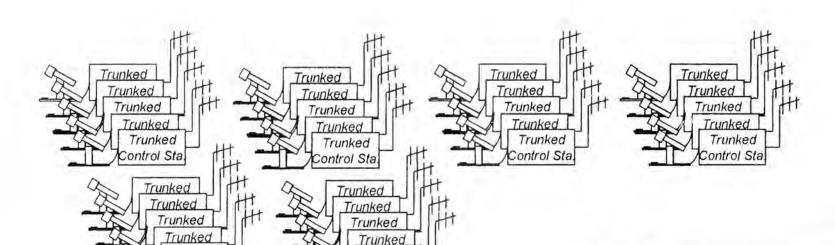
File: austinctrlpt

#### University of Texas Police Control Points

To console switch at Public safety communication center via GAATN



**CRT** based Remote operator position



Trunked

Control Sta

Notes: 1. Need locations of control stations

Trunked

Control Sta.

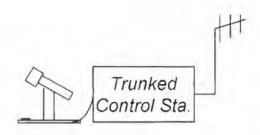
RCC RCC Consultants. Inc.

University of Texas Police Control Points

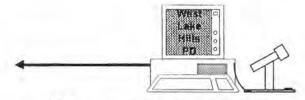
Date: 3/98

File: austinctrlpt

#### Westlake Hills Police Department Control Points



911 Westlsake Drive Westlake Hills, TX



CRT Remote Operator Position No. 1 (Desktop only)

Notes: 1. Need location of control station



RCC Consultants. Inc.

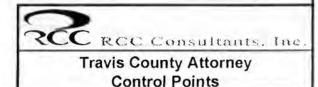
Westlake Hills Police Control Points

Date: 3/98

File: austinctrlpt

### Travis County Attorney's Office Control Point

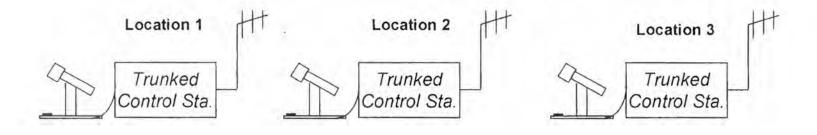
No control station requested



Date: 3/98

File: austinctrlpt

### Transportation & Natural Resources - Planning & Engineering Control Points



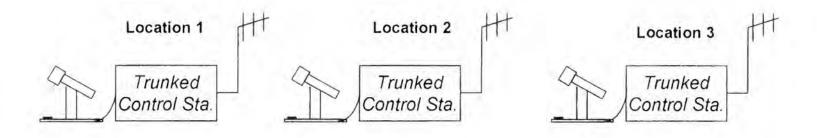
TNR - P & E
Control Points

Date: 3/98

File: austinctrlpt EXHIBIT NO 57

Notes: 1. Need locations for control stations

### Transportation & Natural Resources - Road Maintenance Control Points



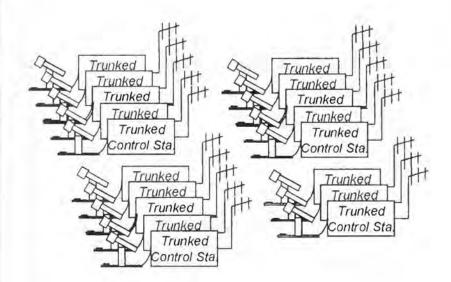
Notes: 1. Need locations for control stations

TNR - R. M.
Control Points

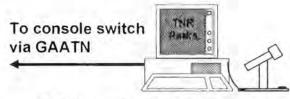
Date: 3/98

File: austinctript

### Transportation & Natural Resources - Parks Control Points



411 West 13th Street



CRT Remote Operator Position No. 1 (Desktop only)



RCC RCC Consultants, Inc.

TNR - Parks Control Points

Date: 5/20/98

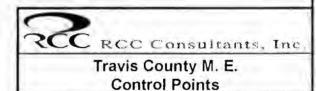
File: austinctrlpt

EXHIBIT NO 59

Notes: 1. Need locations for 18 control stations

### Travis County Medical Examiner's Office Control Points

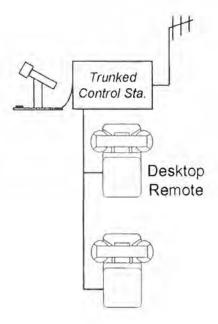
No dispatch points were requested



Date: 3/98

File: austinctrlpt

### Travis County Sheriff's Office Operations Control Points





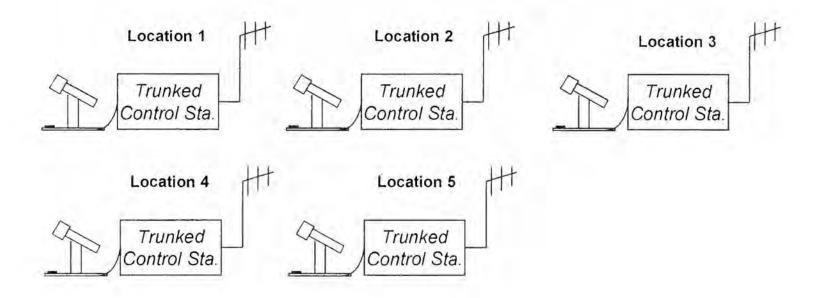
RCC Consultants, Inc.

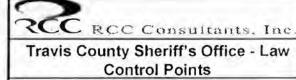
Travis County Sheriff's Office Control Points

Date: 3/98

File: austinctrlpt

### Travis County Sheriff's Office - Law Control Points





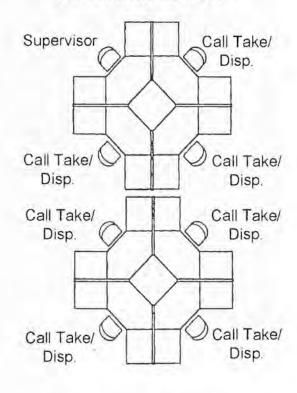
Date: 3/98

File: austinctrlpt

### Travis County Sheriff's Office - Investigative Services Control Points

Existing New UPS System Generator Console Switch ппп Audio & Data Test & Existing Logging Distrib. Panel Recorder GAATN runked Trunked runke Csta. Csta. Csta. Desktop Remote Desktop Remote Desktop Remote Trunked Trunked Trunked Trunked

9301 Johnny Morris Rd.



Notes: 1. Need locations for control stations

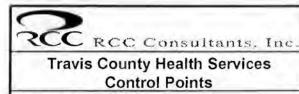
Travis County Sheriff's Office - I. S.
Control Points

Date: 5/20/98

File: austinctrlpt

### Travis County Health Services Control Points

No dispatch points were requested

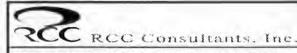


Date: 3/98

File: austinctrlpt

### Travis County District Attorney's Office Control Points

No dispatch points were requested

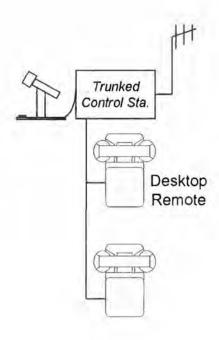


Travis County District Attorney's Office Control Points

Date: 3/98

File: austinctrlpt

### Information & Telecommunications Systems Control Points





RCC RCC Consultants. Inc.

Information & Telecommunications Sys.
Control Points

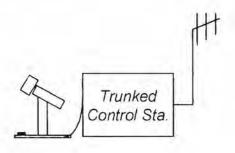
Date: 3/98

File: austinctrlpt

EXHIBIT NO 66

Notes: 1. Need location for control station & remotes

### Travis County Juvenile Courts Control Points





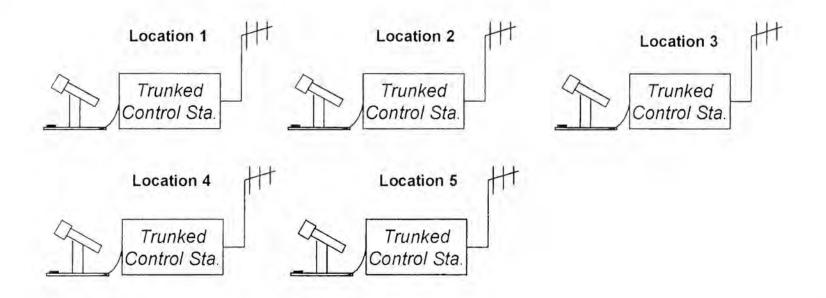
RCC Consultants, Inc.

Travis County Juvenile Courts
Control Points

Date: 3/98

File: austinctrlpt

### Travis County Dept. of Emergency Management Control Points



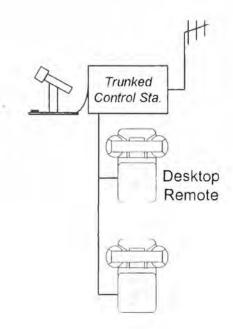
Notes: 1. Need locations for control stations

RCC Consultants, Inc.
Travis County Dept. of Emergency Mgt.
Control Points

Date: 3/98

File: austinctrlpt

#### Travis County Facilities Management Control Points



35

RCC RCC Consultants, Inc.

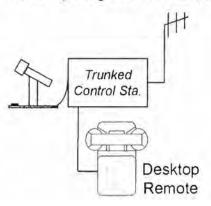
Travis Co. Facilities Management Control Points

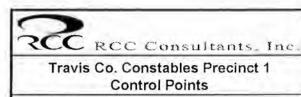
Date: 3/98

File: austinctrlpt

### Travis County Constables Precinct 1 Control Point

#### 1811 Springdale Avenue



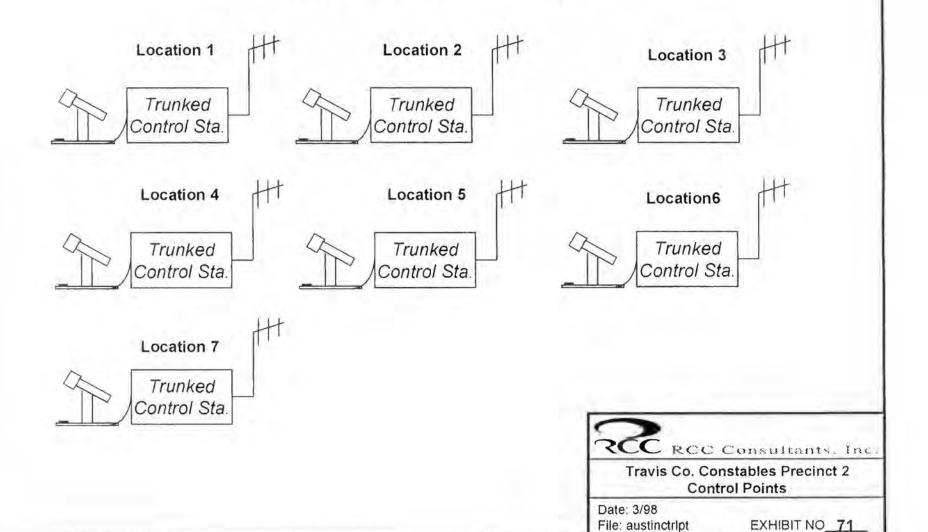


Date: 3/98

File: austinctrlpt

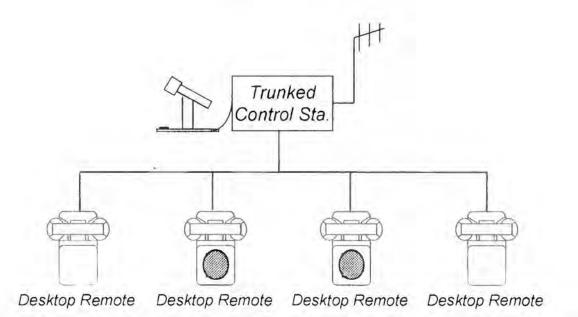
## Travis County Constables Precinct 2 Control Points

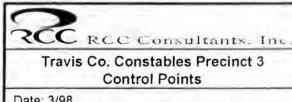
(10409 Burnet Rd., Suite 150)



### **Travis County Constables Precinct 3 Control Point**

(2919 Manchaca Rd.)



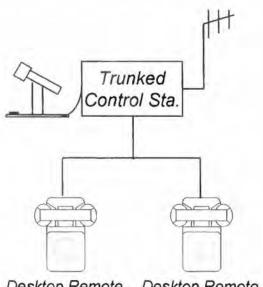


Date: 3/98

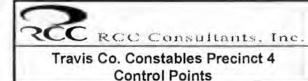
File: austinctrlpt

### **Travis County Constables Precinct 4 Control Point**

(2201 Post Rd., Suite 102)

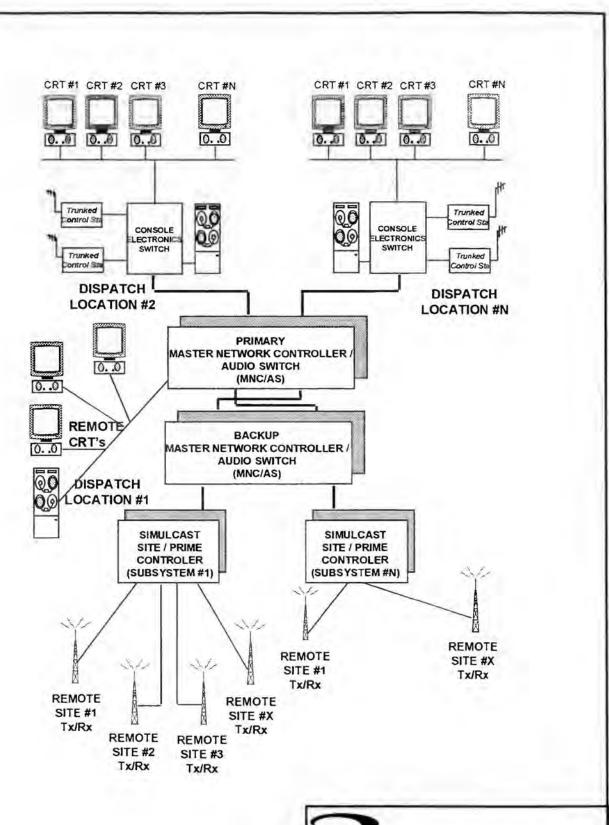


Desktop Remote Desktop Remote



Date: 3/98

File: austinctrlpt





City of Austin Request for Proposal No. RFP VC98300024 Issued on 6/22/98

#### SECTION 19.0

#### 19.0 GLOSSARY OF TERMINOLOGY

Note: Any reference to a manufacturer is for illustrative purposes only.

AC Alternating Current, or Air Conditioning

AGC Automatic Gain Control

AGENCY Governmental entities within the Radio Communications Coalition

ALI Automatic Location Identification

ANI Automatic Number Identification

ASCII American Standard Code for Information Interchange

AWG American Wire Gauge

BACKBONE Fixed-site repeater and control systems.

BC Battalion Chief

BPS Bits per Second

C&C Command and Control

CAD Computer-Aided Dispatch

CITY Austin, Texas

CO Central Office (telephone switching center)

COUNTERPOISE A network or radial system of wires below grade used to couple

lightning energy to ground

COUNTY Travis County, Texas

CONTROL STATION Fixed radio, typically used by dispatchers to eliminate wire line control

of a mobile relay station

CPS Characters per Second

CPU Central Processing Unit

CRT Cathode Ray Tube Video Display Device

CTCSS Continuous Tone Coded Squelch Systems

dB Decibel

DMS Data Management System

DEPARTMENTS Governmental entities within the City of Austin/Travis County, i.e.,

Utilities, Parks, etc.

DESKTOP REMOTE Dispatcher console of type similar to Motorola Series L1236A, GE

CONTROL UNIT RCN-1000, or Zetron Model 7D

DTMF Dial-Tone Multi-Frequency

EMI Electromagnetic Interference

E 9-1-1 Enhanced 9-1-1

FAA Federal Aviation Administration

FCC Federal Communication Commission

FEMA Federal Emergency Management Agency

FIXED EQUIPMENT Radio towers and antenna systems, equipment shelters, repeaters, base

stations, consoles, controllers, microwave, etc.

FLEET Operational subdivision or group within a trunked radio system

GAATN Greater Austin Area Telecommunications Network

GHz Gigahertz

HANDHELD RADIO Personal portable

HVAC Heating, Ventilating, and Air Conditioning

I/O Input/Output

ID Identifier, identification of a specific radio unit

INTEROPERABILITY Communications with units/agencies on differing radio systems.

LPI Lightning Protection Institute, Harvard, IL

MAIN DISPATCH Remote control console for dispatch purposes suitable for large

CONSOLE systems, similar to Motorola Centracom Series II or

Ericsson Maestro

MAJOR OUTAGE Loss of a repeater site or system controller or critical subsystem. Any

department without radio communications, loss of paging, or of any microwave equipment. Loss of a console system switch or two or more events of a primary console operator position Alocking up≅, or

responding to user input commands.

MAY See definition for "SHOULD"

MINOR OUTAGE Loss of individual radios or non-critical system elements.

MDT Mobile Data Terminal

MHz Megahertz

MOBILE RADIO Two-way radio designed to be installed in an automobile, truck, van

or boat

MODEM Modulator/Demodulator, used to link computer equipment

MULTI-CHANNEL Remote control console for dispatch purposes similar to Motorola

CONTROL CONSOLE Dispatcher Series or Console Systems

Minicom

MUX Audio or data multiplexer

NFPA National Fire Protection Association

PA Public Address

PD Police Department

PS Public Safety

PABX Private Automatic Branch Exchange

PORTABLE RADIO Personal handheld radio

PSAP Public Safety Answering Point

PTT Push to Talk

RCC Consultants, Inc.

RF Radio Frequency

RFI Radio Frequency Interference

RFP Request for Proposal

SEAMLESS OPERATION Providing wide-area coverage allowing field personnel to roam

throughout the service area without manually changing systems or

repeater sites on their radios

SHALL Activity, equipment or service that must be provided by RFP

Responders

SHOULD Activity, equipment or service that is desired but not required by RFP

Responders. Same as "MAY"

SO Sheriff's Office

SUBFLEET Operational subdivision within a fleet or group or a trunked radio

system

SYSTEM ACCESS TIME The time interval between PTT and assignment of a radio channel

allowing a conversation to begin

TALK-IN CAPABILITY Voice communications from a portable or handheld radio at waist level

(speaking mic), to a mobile relay or base station

TALK-OUT CAPABILITY Voice communications from a mobile relay or base station to a portable

or handheld radio suspended from the waist of the user